FLORA OF TROPICAL AFRICA.

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FLORA

OF

TROPICAL AFRICA.

BY

DANIEL OLIVER, F.R.S., F.L.S.

KEEPER OF THE HERBARIUM AND LIBRARY IN THE ROYAL GARDENS, KEW, AND PROFESSOR OF BOTANY IN UNIVERSITY COLLEGE, LONDON.

ASSISTED BY OTHER BOTANISTS.

VOL. III.

UMBELLIFERÆ TO EBENACEÆ.

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CONTENTS.

	Page
CONSPECTUS OF THE ORDERS	vii
Order LXVIII. Umbelliferæ	1
LXIX. Araliaceæ	27
LXX. Rubiaceæ	33
LXXI. Valerianeæ	248
LXXII. Dipsaceæ	249
LXXIII. Compositæ	253
LXXIV. Goodenovieæ	461
LXXV. Campanulaceæ	463
LXXVI. Ericaceæ	482
LXXVII. Plumbagineæ	485
LXXVIII. Primulaceæ	487
LXXIX. Myrsineæ	491
LXXX. Sapotaceæ	497
LXXXI. Ebenaceæ	509

CONSPECTUS OF THE ORDERS CONTAINED IN THE THIRD VOLUME.

Class I. DICOTYLEDONES.

Subclass I. POLYPETALÆ.

Cohort XV. Umbellales. Flowers regular (or in some genera the outer petals larger). Ovary inferior 2–∞-celled; ovules solitary, pendulous. Stamens rarely indefinite. Albumen copious, fleshy.

LXVIII. Umbelliferæ. Herbs, rarely shrubs or trees, usually with divided alternate sheathing leaves and umbellate flowers. Ovary 2-celled; styles 2. Carpels dry in fruit, indehiscent and separating.

LXIX. Araliaceæ. Shrubs or trees, with alternate divided leaves and umbellate capitate racemose or spicate flowers. Ovary 2–∞ -celled. Fruit dry or drupaceous, not separating into its constituent carpels.

Subclass II. GAMOPETALÆ.

Cohort XVI. Rubiales. Calyx-limb usually distinct, toothed or lobed. Stamens epipetalous, isomerous, alternate with corolla-lobes. Ovary inferior 2–12- (rarely 1-) celled. Albumen usually copious, very rarely wanting. Leaves opposite or whorled.

LXX. Rubiaceæ. Flowers regular, very rarely irregular. Stipules interpetiolar (absent or leaf-like in *Galieæ*).

Cohort XVII. Asterales. Calyx-limb obsolete or reduced to a pappus. Stamens epipetalous, isomerous or fewer. Ovary inferior, 1-celled, 1-ovulate.

LXXI. Valerianeæ. Leaves opposite exstipulate. Flowers irregular or regular, usually cymose. Stamens 1 or more; anthers free. Ovule pendulous.

LXXII. Dipsaceæ. Leaves opposite, exstipulate. Flowers capitate, each with the ovary enclosed in a tubular sheath. Anther free. Ovule pendulous.

LXXIII. Compositæ. Leaves alternate or opposite. Flowers capitate. Anthers syngenesious. Ovule erect.

Cohort XVIII. Campanales. Calyx-limb toothed or partite, rarely 0. Stamens usually epigynous and free from the corolla. Ovary inferior, 1–∞-celled, 1–∞ -ovulate.

LXXIV. Goodenovieæ (*Scævola*). Corolla oblique, split behind. Anthers free. Indusium cupuliform. Juice not milky.

LXXV. Campanulaceæ. Flowers regular or irregular. Anthers free or syngenesious. Style not indusiate. Juice usually milky.

Cohort XIX. Ericales. Flowers regular or nearly so. Corolla hypogynous (in our species). Stamens as many or twice as many as corolla-lobes. Ovary 4–5 (-∞)-celled.

LXXVI. Ericaceæ. Wiry undershrubs or arborescent. Anthers 2-celled, dehiscing by terminal pores, sometimes prolonged into a longitudinal slit. Fruit capsular.

Cohort XX. Primulales. Flowers regular. Stamens as many as corolla-lobes and opposite to them. Ovary generally superior, 1-celled ; placenta central.

LXXVII. Plumbagineæ. Styles or style-branches 5. Ovule solitary.

LXXVIII. Primulaceæ. Herbs. Style undivided. Ovules 2–∞. Fruit capsular.

LXXIX. Myrsineæ. Shrubs or trees. Style undivided. Ovules 2–∞. Fruit indehiscent.

Cohort XXI. Ebenales. Flowers regular, hermaphrodite or unisexual. Stamens as many as corolla-lobes and opposite to them or 2–3 times as many or more numerous. Ovary 2–∞ -celled. Ovules solitary or in pairs (in our species).

LXXX. Sapotaceæ. Flowers hermaphrodite. Stamens distinctly epipetalous, usually with petaloid staminodia. Radicle inferior.

LXXXI. Ebenaceæ. Flowers usually dicœcious. Stamens inserted usually on the base of the corolla. Radicle superior.

N.B.—Pages 1 to 32 were printed off with the previous volume (in 1871); this explains the absence of some names since published.

FLORA OF TROPICAL AFRICA.

Order LXVIII. **UMBELLIFERÆ.** (By Mr. W. P. Hiern.)

Calyx-tube wholly adnate to the ovary; calyx-teeth 5, often reduced so as to leave a raised line at the top of the tube, or obsolete. Petals 5, inserted at the top of the calyx-tube and alternating with its teeth, usually inflected at the tip, with impressed midrib and emarginate, sometimes unequal; connivent or somewhat imbricated in bud, rarely valvate. Stamens 5, inserted at the top of the calyx-tube, and alternating with the petals, glabrous; filaments slender, distinct, inflected in bud; anthers versatile, with 2 parallel cells dehiscing longitudinally. Ovary 2-celled; styles 2 (in abnormal flowers occasionally 3), simple, glabrous, erect when young, diverging afterwards, usually persistent, often dilated at the base (stylopods), distinct from or confluent with an epigynous usually 2-lobed disk, which is placed interior to the stamens. Fruit 2-celled, glabrous or covered with various kinds of hair, usually separating into 2 indehiscent 1-seeded mericarps which are attached near the apex of their faces (or adjacent sides) to a central axis (carpophore), which usually splits and allows the mericarps to separate from their medial plane or commissure, or occasionally remains undivided. In some cases the carpophore is absent, and the fruit remains united at the commissure. The mericarps are usually marked by five longitudinal lines (primary ridges), 2 of which are *lateral*, corresponding to the external sides of the commissure, 1 *dorsal* at the middle of the *back*, and 2 *intermediate*. Sometimes 4 more lines (*secondary ridges*) appear on the mericarp alternating with the primary ridges, and even in some genera are more prominent than the latter. The primary ridges are not always equally developed, frequently the lateral ones are dilated into wings, and occasionally the dorsal one, while the rest remain less prominent. In most genera there are longitudinal lines (*vittæ*), receptacles of aromatic or pungent resinous oil, either solitary or a few together inside, or interior to the pericarp alternating with the primary ridges, and also some on the commissural faces. Seeds pendulous from the point of attachment to the carpophore. Testa thin; albumen hard; embryo,

minute, near the apex of the seed, straight; radicle superior.—Herbs, rarely shrubs, very rarely trees, annual, biennial, or perennial. Leaves alternate or rarely subopposite, frequently decompound, usually membranous; petioles sheathing or amplexicaul at the base, and usually without separate stipules. Flowers often polygamous, arranged in terminal or lateral, simple or compound umbels, which in some cases are reduced to capitula. Bracts and bracteoles usually present, forming respectively the involucres and involucels.

A large family abounding in temperate latitudes, especially in the Northern hemisphere, but represented more or less in nearly all parts of the world.

Five genera are endemic in Africa, and three in Tropical Asia.

Umbels simple, capitate, or irregularly compound. Carpophore 0. (HETEROSCIADEÆ.)
- Calyx-lobes obsolete. Fruit laterally compressed, glabrous.
  - Commissure narrow. Vittæ 0 . . . . . 1. HYDROCOTYLE.
- Calyx-lobes prominent. Fruit subterete or slightly compressed, vesicular or echinate. Commissure broad. Vittæ solitary. (SANICULEÆ.)
  - Fruit vesicular. Flowers capitate, all sessile. Rigid.
    - Capitula cylindrical, containing bracts . . . . . 2. ERYNGIUM.
    - Capitula globular, not containing bracts . . . . . 3. ALEPIDEA.
  - Fruit echinate. Flowers all or the male ones pedicelled . . 4. SANICULA.

Umbels regularly compound. Fruit without prominent secondary ridges. Vittæ between the primary ridges. (HAPLOZYGIÆ.)
- Female flowers solitary, sessile, in the centre of each umbellule 5. PYCNOCYCLA.
- Female flowers not solitary.
  - Fruit not winged, or if so, laterally compressed; subterete or laterally compressed.
    - Fruit laterally compressed (slightly so and ovate in *Ammi*.) (AMMINEÆ.)
      - Seeds deeply grooved in front . . . . . 6. CONIUM.
      - Seeds not deeply grooved in front.
        - Stem very short. Peduncles abbreviated . . . . 7. TRACHYDIUM.
        - Stem elongated or peduncles not abbreviated.
          - Shrub. Mericarps dissimilar . . . . . 8. HETEROMORPHA
          - Herbs. Mericarps similar.
            - Fruit ovoid or didymous.
              - Vittæ solitary.
                - Umbels subsessile or shortly stalked . . . 9. APIUM.
                - Umbels manifestly stalked.
                  - Bracts of involucre several, dissected . . 10. AMMI.
                  - Bracts of involucre 0 or linear . . . . 11. CARUM.
              - Vittæ ∞.
                - Bracts of involucre ∞. Carpophore 0 . . 12. SIUM.
                - Bracts of involucre few or 0 (except *P. simensis*). Carpophore bipartite or bifid . . 13. PIMPINELLA.
            - Fruit ovate-oblong. Ridges inconspicuous . . 14. ANTHRISCUS.

Fruit oblong, subterete. Vittæ solitary. (SESELINEÆ.)
- Fruit hirsute. Involucre and involucels of many bracts 15. DIPLOLOPHIUM.
- Fruit glabrous. Involucre and involucels wanting. (Cultivated) . . . . . *Fœniculum.*

Fruit much compressed dorsally, winged. (PEUCEDANEÆ.)
- Margin of the fruit thinner than the disk.
  - Vittæ ∞ . . . . . 16. FERULA.
  - Vittæ solitary.
    - Wings of the fruit not separated at the apex by a deep narrow sinus . . . . . 17. PEUCEDANUM.

Wings of the fruit separated at the apex by a deep narrow sinus . . . . . 18. LEFEBURIA.
Margins of the fruit thickened . . . . . 19. MALABAILA.
Umbels regularly compound. Vittæ within the prominent secondary ridges. (DIPLOZYGIÆ.)
Fruit glabrous or papilloso-hispidulous.
Fruit subglobose. Involucre 0 (cultivated) . . . . . *Coriandrum.*
Fruit narrowly oblong. Involucre of a few bracts (cultivated). *Cuminum.*
Fruit setose.
Seeds not deeply sulcate in front . . . . . 20. DAUCUS.
Seeds deeply sulcate in front . . . . . 21. CAUCALIS.

Of the genera represented only by cultivated species we have the following:—

Coriandrum sativum, L., DC. Prod. iv. 250. (Coriander.) An erect glabrous annual or biennial, with finely divided leaves, globose 10-ribbed fruit, white unequal petals, no involucre, and few-leaved involucels. Nubia, Sennaar, and Abyssinia.

Cuminum Cyminum, L., DC. Prod. iv. 201. (Cumin.) An erect glabrous annual, with finely divided leaves, laterally contracted hairy fruit, white or reddish flowers, and 2–4-leaved involucre and involucels. Sennaar?

Fœniculum capillaceum, Gilib. Fl. Lithuan. (1782); *F. officinale*, Allioni, Fl. Piedemont. ii. 25 (1785); *F. vulgare*, Gærtn. Carp. i. 105, t. 23, f. 5 (1788), DC. Prod. iv. 142 (1830.) Fennel. An erect, tall, glabrous biennial, with very finely divided leaves, and neither involucre nor involucels. Abyssinia, in gardens, *Schweinfurth.*

1. HYDROCOTYLE, Linn.; Benth. et Hook. f. Gen. Plant. i. 872.

Calyx with obsolete lobes. Petals entire, somewhat concave, and often inflexed at the apex, valvular or imbricated in bud. Disk flat; styles filiform from the base. Fruit laterally compressed, marked with acute or slight primary ridges, and without or rarely with weak secondary ridges, often subdidymous and cordate or emarginate at the base, without vittæ; lateral ridges often concealed in the narrow commissure; carpophore 0, commissure narrow. Seeds laterally compressed.—Annual or perennial herbs, usually prostrate and creeping, rarely erect, growing in moist places. Leaves flat, orbicular, or subreniform, usually with crenate lobes, peltate or cordate, membranous, stalked, palmately veined, stipulate. Flowers in umbels, single or irregularly compound, often in globose capitula, with involucre, often monœcious, usually white.

Occurs in various parts of the world, especially in the temperate regions of the Northern hemisphere.

Petals valvular in bud. Fruit without secondary ridges. (EUHYDROCOTYLE.)
Leaves orbicular, peltately attached by the centre . . . . . 1. *H. Bonariensis.*
Leaves rounded or reniform-cordate, with a deep sinus reaching to the attachment of the petiole.
Fruits in nearly sessile heads . . . . . 2. *H. americana.*
Fruits in distinctly peduncled heads.
Heads many-flowered.
Glabrous, erect . . . . . 3. *H. javanica.*
Piloso-hispid, creeping . . . . . 4. *H. moschata.*
Heads few-flowered.
Slender . . . . . 5. *H. nitidula.*
Robust . . . . . 6. *H. natans.*
Petals imbricate in bud. Fruit with faint secondary ridges. (CENTELLA.) . . . . . 7. *H. asiatica.*

1. **H. Bonariensis,** *Lam.*; *DC. Prod.* iv. 60. Glabrous. Stem creeping, usually rooting at the nodes. Leaves peltate, suborbicular, doubly crenate or dentate, many-veined (14 or 15), often notched at base, varying from less than an inch to nearly five inches across; petioles solitary, or rarely two together, long, erect, varying in length from an inch to a foot; stipules short, wide, entire, caducous. Umbels umbellate and umbellately branched with rays interruptedly whorled, many-flowered, on erect peduncles longer than the petioles, and sometimes above a foot high. Ultimate pedicels short, distinct. Involucre of many small lanceolate leaves, at every division of the umbel. Flowers monœcious or polygamous, with green calyx and elliptic white petals, inflexed at the apex and valvular in bud. Styles shorter than the fruit and diverging. Fruit shortly suborbicular, emarginate and subcordate at the base, about $\frac{1}{10}$ in. wide; secondary ridges none.—*H. petiolaris*, DC. l.c.

Upper Guinea. Niger, *Barter! Vogel! Ansell!* Camaroons mountains, *Mann!* Fl. and fr. June; 2–3 ft. high.

Mozamb. Distr. Zambesia, *Dr. Kirk!* Fr. Nov. and Dec.

Also in Mauritius, Madagascar, and hotter parts of America.

In damp places or by river banks.

2. **H. americana,** *Linn.*; *DC. Prod.* iv. 64. Var. β. *monticola*, *Hook. f.* (*sp.*) *Journ. Linn. Soc.* vii. 194. Very small, with slender, creeping, elongated, and interlacing stems, 2–4 in. long, quite glabrous, except that the leaves beneath are sometimes pilose about the insertion of the petiole. Leaves orbicular, with 6–9 crenate shallow lobes, about $\frac{1}{4}$ in. in diameter, with a sinus closed or nearly so extending quite up to the petiole. Petioles $\frac{1}{8}$–$\frac{1}{2}$ in. long, solitary or occasionally 2 together; stipules rather large. Umbels subsessile, 2–4-flowered, with very short pedicels. Peduncles $\frac{1}{16}$–$\frac{1}{2}$ in. long, solitary. Involucre consisting of linear bracts; petals valvular in bud; styles rather short. Fruit with acutely marked primary ridges and without secondary ridges, about $\frac{1}{24}$ in. wide.

Upper Guinea. Fernando Po, 8500 ft. alt., *Mann!*

Differs from the tropical form of the species by its smaller size and by its comparatively larger stipules.

Var. γ. *minima*, Hochst. (sp.) in A. Rich. Fl. Abyss. i. 319. Glabrous, 2–3 in. long. Leaves minute, about $\frac{1}{10}$ in. in diameter, 5-veined. Peduncles very short, bearing 3 or 4 sessile flowers.

Nile Land. Abyssinia, 10,000 ft. alt., fr. Feb., *Schimper! Ferret and Galinier;* fl. end of Feb. (Form with monœcious flowers: male reddish with 3–4 stamens; female apetalous (?); stigma capitate.)

The species occurs also in North and South America, New Zealand, Natal, &c.

3. **H. javanica,** *Thunb.*; *DC. Prod.* iv. 67. Glabrous, perennial, sarmentose with erect branching shoots, more than 6 in. high. Leaves suborbicular, membranaceous, alternate, 9-lobed, divided at the base up to the insertion of the petiole; lobes rounded, divided to about $\frac{1}{4}$ down, crenate-serrate, 1½–2 in. broad; petioles erect, longer than the breadth of the leaves; stipules rather wide, entire; peduncle shorter than the

petioles, slender, erect, solitary, axillary; heads globular, $\frac{1}{5}$ in. in diameter, bearing from 10–20 flowers on very short slender pedicels; bracts small. Fruit with acute primary but without secondary ridges, $\frac{1}{15}$ in. broad, emarginate or subcordate at the base: styles shorter than the fruit.

Mozamb. Distr. Moramballa, 3500 ft. alt.; fl. and fr. December, *Dr. Kirk!*
Occurs also in Java, India, &c.

4. **H. moschata,** *Forst.; DC. Prod.* iv. 67. Piloso-hispid, stem prostrate or creeping, rather slender, often rooting at the nodes, 2–10 in. long. Leaves orbicular, slit at the base up to central insertion of petiole, with 5–7 crenate lobes extending about $\frac{1}{3}$ down, $\frac{1}{3}$–$\frac{2}{3}$ in. wide; petioles longer than the leaves, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, usually solitary; stipules ovate, $\frac{1}{12}$ in. long; peduncles usually solitary, slender, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Flowers capitate, crowded, many together, on very short pedicels, in globose heads $\frac{1}{8}$ in. in diameter; bracts small; petals green, valvular in bud; style nearly as long as the fruit. Fruit with acute primary and no secondary ridges, small, about $\frac{1}{20}$ in. wide; mericarp with 1 rib on each face, acute at the back.—*H. Mannii*, Hook. f. Journ. Linn. Soc. vii. 194; *H. grossularioides*, Rich., DC. Prod. iv. 68.

Upper Guinea. Fernando Po, 7000 ft. alt., *Mann!*
Mozamb. Distr. Tshiradzura mountains; fr. October, *Dr. Kirk!* in river-course.
Occurs also in Bourbon, New Zealand, &c.

5. **H. nitidula,** *Rich.; DC. Prod.* iv. 66. Slender, stem glabrous, creeping, often rooting at the nodes. Leaves suborbicular, with 5–7 slightly cut lobes, with a narrow sinus reaching the insertion of the petiole, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, glabrous and somewhat shining on upper surface, glabrous or somewhat hispid on lower surface; petioles $\frac{2}{5}$–1 in. long, glabrous, solitary or 2 together, sometimes hairy at apex; stipules ovate, glabrous, about $\frac{1}{20}$ in. long; peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long, solitary, glabrous, very slender. Heads with 6–8 sessile flowers, each of which flowers has a small ovate bract at the base. Fruit $\frac{1}{25}$ in. wide, glabrous, without secondary ridges; styles short.

Lower Guinea. Angola, Huilla, 5000–5500 ft. alt., fr. April, *Dr. Welwitsch!*
Occurs also in Java.

6. **H. natans,** *Cyr.; DC. Prod.* iv. 62. Glabrous, perennial, creeping, much rooting at the nodes, robust. Leaves suborbicular or subreniform, slit at the base up to central insertion of very long petiole, 1–$2\frac{1}{2}$ in. wide, distinctly lobed; lobes shallowly crenate; veins feeble; petioles erect, sometimes about a foot high, thick. Peduncles much shorter than the petioles, not exceeding 3 in. long; bracts small, apiculate. Flowers about 7 together on short slender pedicels as long as the fruit. Petals as long as the calyx, valvular in bud. Fruit $\frac{1}{8}$ in. broad by $\frac{1}{12}$ in. long with weak primary ridges and no secondary ridges; styles slender, shorter than the fruit.—*Hydrocotyle adöensis*, Hochst. in Hb. Schimp. Abyss.

Nile Land. Abyssinia, *Schimper!* fl. and fr. March and November. Unyoro, 3300 ft. alt. 1° 37′ N. lat., *Speke and Grant!*

Occurs also in Italy, Palestine, Sicily, California, and Peru.

Grows in marshes or streams.

7. **H. asiatica,** *Linn.; DC. Prod.* iv. 62. Perennial. Stem long, creeping and often rooting at the nodes, usually glabrous. Leaves deeply cordate-reniform, many-veined, equally crenate, crenulate or without obtuse teeth, 1–2 in. wide, glabrous or pubescent; petioles usually 2 or more together, glabrous or pubescent, variable in length up to 5 in. or more; stipules broad. Peduncles fascicled, glabrous or pubescent, varying in length up to ½ in. or more, equal in the same fascicle. Involucre consisting of 2 or 3 broad pubescent bracts shorter than the fruit and some linear ones inside. Umbels containing about 4 flowers on very short pedicels. Flowers often monœcious. Petals broad, much imbricated in bud; styles rather short. Fruit somewhat pubescent or glabrous, ⅐ in. wide, with primary ridges and weaker secondary ridges,—Refug. Bot. t. 202. *H. nummularioides,* Rich., DC. Prod. iv. 63.

Abyssinian name, *Tabao.*

Upper Guinea. Prince's Island, *Mann!* St. Thomas, *G. Don!*

Nile Land. Abyssinia, Adoa, fl. and fr. Oct., *Schimper!* Chiré, fr. July, *Quartin-Dillon.*

Lower Guinea. Congo, *Chr. Smith!* Angola, Tcolo e Bengo, fl. and fr. Dec., Libongo, fl. and fr. Sept., Mossamedes, Golungo Alto, 1000–2400 ft. alt., fl. and fr. July; Huilla, 3800–5500 ft. alt., fl. and fr. Jan.; Pungo Andongo, 3500 ft. alt., *Dr. Welwitsch!*

Mozamb. Distr. Delta below Mazzaro, fl. and fr. March, *Dr. Kirk!* Roangwa, near Lake Nyassa, fr. Sept., *Dr. Kirk!* (variety with tomentose petioles, more coriaceous and deltoidly dentate leaves.) Zanzibar, *Dr. Kirk!*

Widely spread over the tropical and subtropical regions of the whole world.

2. ERYNGIUM, Linn.; Benth. et Hook. f. Gen. Plant. i. 878.

Calyx-tube covered with small vesicles; calyx-teeth rigid, acute, longer than the petals. Petals erect, notched, each with an inflexed point as long as the rest of the petal; disk dilated; styles filiform from the base. Fruit widening upwards, but little laterally compressed; ridges inconspicuous; transverse section of mericarp nearly square, with exterior corner rounded; commissure wide; carpophore 0; vittæ 0, or scarcely visible within the small folds of the ridges. Seeds subterete. Leaves spinously serrate. Flowers in dense sessile heads, with bracteoles, hermaphrodite.

A large genus, scattered over the warmer and temperate parts of the whole world, except South Africa.

1. **E. fœtidum,** *Linn.; DC. Prod.* iv. 94. Glabrous spinulose rigid erect biennial herb, with strong smell, 2–3 ft. high, dichotomously branched above. Stem deeply striate. Radical leaves several, oblanceolate, attenuate at base, rounded at apex, sheathing at end of petiole, ranging up to 10 in. long. Floral leaves palmatipartite, sessile, about 1½ in. long. Flowers white; heads cylindrical, shorter than the

leaves, about $\frac{1}{2}$ in. long by $\frac{1}{6}$ in. thick, at ends of stem and branches. Filaments long, slender. Styles long; bracteoles longer than the flowers.

Upper Guinea. Niger Expedition, Prince's Island, to 2000 ft. alt., common, *Barter!* St. Thomas Island, 1000 ft. alt., *Mann!*

Occurs also in South America, where it is cultivated as a condiment; Florida, and the West Indies.

3. **ALEPIDEA**, Laroch.; Benth. et Hook. f. Gen. Plant. i. 878.

Calyx-tube covered with small tubercles; calyx-lobes ovate, rather blunt, membranaceous, not imbricated in bud, persistent. Petals erect, submarginate, inflexed. Fruit but little compressed laterally, tubercled; commissure wide, primary ridges 5, manifest, enclosing one vitta in each; secondary ridges wanting; carpophore 0. Styles filiform, thicker towards the base; disk sessile, annular.—Glabrous erect herbs, simple at base, 1–5 ft. high. Leaves rigid, serrato-ciliate, those at the base of the umbel 3–4-partite. Flowers without paleæ, sessile, in small globular heads, the outer ones opposite the segments of the involucre, hermaphrodite. Involucre usually 10-partite, the segments alternately longer and shorter, entire, all exceeding the flowers and fruits, often white or coloured inside.

A genus containing three species, occurring only in Africa; possibly the three are only forms of one species (*A. ciliaris*, Laroch.).

Bracts of the involucre not exceeding $\frac{1}{4}$ in. in length. Radical and basal leaves attenuate at base	1. *A. amatymbica.*
Longer bracts of the involucre about $\frac{1}{2}$ in. long. Basal leaves sometimes rounded at base and distinctly petiolate	2. *A. peduncularis.*

1. **A. amatymbica,** *Eck. et Zeyh. Enum. Pl. Afr. Austr.* 339, *n.* 2189. Stem sulcate, 1–2½ ft. high. Radical leaves oblanceolate, attenuate at base, about 6 in. long; stem-leaves lanceolate-oblong, clasping and auricled at base, shorter. Flowers many in each head, small. Involucre not more than $\frac{1}{4}$ in. long.—*A. longifolia*, E. Mey.

Mozamb. Distr. Sotshi, Manganja mountains, lat. 15° 20′ S., alt. 3000 ft.; fl. Oct., *Dr. Kirk!*

Occurs also in South Africa and Natal.

2. **A. peduncularis,** *Steud. in Rich. Fl. Abyss.* i. 320. Stem striate, 1–2 ft. high. Radical leaves attenuate at base; basal leaves often oblong, rounded at the base and distinctly petiolate, about 6 in. long. Stem-leaves oblong or lanceolate, clasping and auricled at base, shortening upwards. Flowers about 12 in each head. Styles long, curving outwards. Fruit rather larger than in the former species, $\frac{1}{15}$ in. long. Involucre about $\frac{1}{2}$ in. long.

Nile Land. Abyssinia, *Schimper!* fl. in Jan. and August.

4. **SANICULA**, Linn.; Benth. et Hook. f. Gen. Plant. i. 880.

Calyx-teeth herbaceous, persistent, lanceolate. Petals erect, emarginate, inflexed with a long acuminate point, 1-veined, slightly imbri-

cated in æstivation. Disk flat. Fruit ovoid, somewhat compressed laterally, with wide commissure, echinate with long spines hooked at the end; ridges imperceptible; vittæ 10, opposite the usual places for primary ridges; carpophore 0. Seeds semi-terete.—Perennial erect slender herbs. Leaves palmately divided with serrate mucronate obovate segments. Umbels irregularly compound, terminal; heads small; bracts narrow. Flowers usually monœcious, the outer flowers stalked and male, the inner ones subsessile and female.

A moderate-sized genus, widely dispersed over the temperate regions of the world.

1. **S. europæa,** *Linn.; DC. Prod.* iv. 84. Glabrous and shining. Stem striate, 1–3 ft. high. Radical leaves 1–3 in. wide, on long slender petioles, from 1½–9 in. long; the petioles of the upper leaves continually shortening. Primary bracts 2, usually with 2 acute small lobes near base; ultimate bracts of the involucre small and lanceolate. Flowers few in the heads, pink or white. Styles long, slender, spreading. Fruit $\frac{1}{6}$ in. long.—*S. capensis*, Eck. et Zeyh. Enum. Pl. Afr. Austr. 339, n. 2186.

Upper Guinea. Camaroons mountains, 4000–7000 ft. alt., fl. and fr. Dec.–Feb. Clarence Peak, Fernando Po, 4000 ft. alt., fr. Nov., *Mann!*

Nile Land. Abyssinia, Schoata, fl. and fr. July, *Schimper!*

Occurs over a very wide range in the mountainous regions of both America and Asia, in moist situations in Europe, and also in South Africa.

5. PYCNOCYCLA, Lindl.; Benth. et Hook. f. Gen. Plant. i. 881.

Calyx-teeth small, lanceolate, acute, patent in flower; often unequal in the outer flowers. Petals often unequal, especially in the outer flowers, with an inflexed point, 2-lobed. Disk annular, consisting of 10 small undulations; ovary ovoid. Fruit cylindrical, with rounded primary ridges, pubescent, with one carpel often partly-abortive; commissure wide; vittæ indefinite; carpophore 0. Seeds subterete.—Rigid erect herbs. Umbels compound, compact; involucres and involucels rigid, entire; central flower only in each umbellulate perfect.

A small genus, occurring also in Western and Central Asia.

1. **P. glauca,** *Lindl. in Royle Illustr.* 232, t. 51. Perennial, 1 to 2 ft. high, branched from the base, subglaucescent. Stem terete, slender, slightly pubescent and furrowed. Leaves pinnately dissected, the radical ones long-petioled, clasping at the base, with filiform acutely-tipped segments, glabrous, or at base very nearly so; the clasping base with shortly ciliate margins; furrowed especially on the subcylindrical petioles; the stem leaves very few, smaller, similar. Umbels at extremity of long pubescent peduncles, hemispherical, in flower about ½ in. in diameter; involucre hispid, consisting of several small, narrow acute bracts; involucel similar and smaller, 1-veined. Flowers sessile, 9 in a shortly stalked umbellule. Calyx-lobes pubescent outside and ciliate, reddish in fruit. Petals white, with reddish midrib, curved inwards, with 2 large diverging lateral enlarged lobes extending outwards

and upwards, hairy about the midrib inside, and on adjacent margins of lobes; outer petal of outer flowers often larger than the rest. Filaments long. Styles glabrous long; vittæ about 7 in one row, unequally distributed in each mericarp. Fruit $\frac{1}{2}$ in. long.—*P. abyssinica*, Hochst. in Rich. Fl. Abyss. i. 333.

Nile Land. Abyssinia, Mount Scholoda, near Adoa, fl. Nov., *Schimper!*
Occurs also in N-W. India.

6. **CONIUM**, Linn.; Benth. et Hook. f. Gen. Plant. i. 883.

Calyx-teeth minute or obsolete. Petals obovate with a short inflected acumen, slightly emarginate in consequence of the midrib being deeply impressed inwards, imbricate in æstivation. Filaments not exceeding the petals. Stylopodes depressed; styles short, reflexed; ovules obovoid. Fruit ovoid, laterally compressed, ultimately with a narrow commissure; mericarp 5-seeded; primary ridges equal prominent blunt undulate crenulate, at length smooth. Carpophore ultimately divided; vittæ ∞, very small. Seeds transversely pentagonal, deeply and narrowly sulcate along the middle line of the face.—A biennial tall glabrous herb. Leaves 2–4 times pinnate, with segments pinnatifid and incise-dentate. Umbels regularly compound, of several primary and secondary rays.

A genus of only one species, which is widely dispersed over the Northern hemisphere of the Old World.

1. **C. maculatum,** *Linn.; DC. Prod.* iv. 242. Stem striate or sulcate, tall, 2–5 ft. high, hollow, with opposite and alternate often spotted leaves and branches; ultimate segments of the leaves acute; radical leaves large on long dilated and sheathing petioles. Bracts of the involucre and involucel shorter than the rays, lanceolate, caducous. Root conical. Fruit $\frac{1}{6}$–$\frac{1}{5}$ in. long. Primary rays of fruiting umbel scarcely an inch long, secondary rays $\frac{1}{4}$ in. long.—*Seseli chærophylloides*, Thunb. Prod. 51, DC. Prod. iv. 148; *C. chærophylloides*, Eck. et Zeyh. Enum. Pl. Afr. Austr. 355, n. 2264.

Nile Land. Abyssinia, *Schimper!*

7. **TRACHYDIUM**, Lindl.; Benth. et Hook. f. Gen. Plant. i. 884.

Calyx-teeth small. Petals ovate-lanceolate, 1–3-veined, entire, with an inflexed acute point. Stamens longer than the petals. Stylopods convex; style erect; fruit ovoid, laterally compressed, somewhat narrowed at the commissure. Primary ridges blunt, vesiculoso-rugose papulose or smooth; carpophore bifid or bipartite. Seeds transversely semilunate or subterete, concave on the face.—Glabrous herbs. Leaves subradical, pinnate, with pinnatipartite acute segments. Umbels regularly compound with abbreviated peduncle, long rays and short pedicels, and with many-leaved involucres and involucels. Vittæ alter-

nating with the ridges, 1, 2, or 3 together.—*Haplosciadium*, Hochst. in Flora 1844, 20.

A small genus, chiefly Himalayan.

1. **T. abyssinicum,** *Benth. et Hook. f. l.c.* Root fusiform. Stem very short. Leaves narrowly oblong, 2–3 in. long by about ½ in. wide. Bracts of the umbel lanceolate-linear, entire, scarious, 1¼ in. long; those of the involucel similar and smaller, but equalling or slightly exceeding the pedicels. Primary rays 1–6 in. long. Flowers crowded on pedicels about 2 in. long, white.—*Haplosciadium abyssinicum*, Hochst. l.c.

Nile Land. Abyssinia, Enschedcap, Simen, fl. July, fr. October, 13,600 ft. alt. *Schimper!*

The specimens are only in flower and young fruit, but in habit quite resemble the Asiatic specimens of *Trachydium*.

Grows in mountain pastures.

8. HETEROMORPHA, Cham. et Schlecht.; Benth. et Hook. f. Gen. Plant. i. 887.

Calyx-teeth conspicuous, acute. Petals entire, ovate, with a long involute acumen, somewhat imbricate in æstivation. Disk with undulated margin and conical stylopods. Fruit smooth, obovate-oblong, laterally compressed to rather a wide commissure; primary ridges 5 in each mericarp, unequal, 2 of which in 1 mericarp and 3 in its fellow are winged; the 2 lateral wings in the latter either patent or appressed to the adjacent sides of the former, thus making the fruit 5- or 3-winged; 1 mericarp often abortive. Vittæ 12, conspicuous, alternate with the ridges, and 2 in each commissural face. Carpophore bipartite. Seeds subterete.—A glabrous shrub with slender terete rubescent branches. Leaves flat, of a pale bright green colour, simple or 3–5-foliate, thinly coriaceous, minutely reticulate; leaflets lanceolate, acute or occasionally blunt, narrowed at the base, simple or bifoliate, terminal one often trifoliate; petioles amplexicaul at the base. Umbels regularly compound, terminal and subterminal, of many rays; involucre of many unequal fugacious leaflike simple bracts; involucels of many small lanceolate bracteoles.

A genus of but one species, which occurs also in South Africa.

1. **H. arborescens,** *Cham. et Schlecht.; DC. Prod.* iv. 134. Leaves 1–5 in. long; margins entire or very minutely crenulate. Petioles of the compound leaves 1–1½ in. long. Rays of the umbel about 1 in. long, those of the umbellules about ⅛ in. long, slender. Receptacle of the rays dilated. Fruit ¼ in. long.—*H. abyssinica*, Hochst. in Rich. Fl. Abyss. i. 625.

Nile Land. Abyssinia, *Schimper!* fl. and fr. October, *Parkyns! Salt!* Upper Nile, 2° S. lat., *Speke and Grant!* 399, flower-bud in December.

Mozamb. Distr. Manganja hills, *Dr. Meller!* 1500–1800 ft. alt., fr. Sept.

Abyssinian name, *Merrussĕbbi*. Tigre name, *Mercus Suurvi*.

Annesorhiza abyssinica, A. Br. in Flora (Bot. Zeit.) 1841, i. 337–340, tab. 2, fig. B., was described only from the fruit. The description seems to suit *Heteromorpha* better than *Annesorhiza*, and it is possible that the fruit belonged to *H. arborescens*, Ch. and Schl.

9. **APIUM**, Linn.; Benth. et Hook. f. Gen. Plant. i. 888.

Calyx-teeth obsolete. Petals ovate, concave, entire or slightly emarginate, inflexed at the apex. Stylopods depressed, margins entire; styles short, divergent. Fruit ovate, laterally compressed; primary ridges blunt, equal; secondary ridges rounded, rather prominent; mericarp 5-sided. Vittæ solitary, conspicuous, opposite the secondary ridges, but 2 in the commissural face of each mericarp. Carpophore undivided.—Herb. Leaves pinnate. Umbels regularly compound, usually opposite the leaves; involucre none; involucels of 0 or many leaves. Flowers white.

Genus of moderate size, scattered over the whole world.
Apium graveolens, L., Celery, is cultivated in Abyssinia. It has no bracteoles.

1. **A. nodiflorum,** *Reichb. f. Fl. Germ. Umb.* t. 15. Glabrous perennial. Stem creeping or decumbent, hollow, rooting at the lower nodes, long, striate. Leaves on long petioles which are suddenly dilated below the middle and amplexicaul towards base; leaflets oval ovate or ovate-oblong, serrate, $\frac{1}{2}$ to 2 in. long. Umbels subsessile or shortly stalked, of 5–10 primary rays 1–1$\frac{1}{2}$ in. long, each with numerous slender secondary rays $\frac{1}{8}$–$\frac{1}{4}$ in. long; involucels with many lanceolate leaves minutely denticulate, and about equalling the secondary rays. Fruit $\frac{1}{16}$ in. long.—*Sium nodiflorum*, Linn.; *Helosciadium nodiflorum*, Koch, DC. Prod. iv. 104.

Nile Land. Abyssinia, *Schimper!* fl. in March and November.
Widely spread throughout Europe.

10. **AMMI**, Linn.; Benth. et Hook. f. Gen. Plant. i. 889.

Calyx-teeth obsolete; petals widely obovate, with a long inflected acumen and 2 lateral rounded lobes above, white. Stylopods shortly conical; styles rather long, and in flower. Fruit long-ovoid, very slightly compressed laterally; transverse section of mericarp pentagonal-reniform; primary ridges prominent, blunt; vittæ solitary, alternate with the primary ridges, but 2 corresponding to each commissural face. Carpophore bipartite. Seed subreniform, with the concavity directed inwards.—Glabrous and branched herbs. Leaves pinnatisect; all the lobes with cartilaginous acutely serrulate margins, oval or lanceolate in the lower leaves, in the upper multifid and linear. Umbels regularly compound of many primary and secondary rays. Bracts of the involucre several, usually 3-cut; of the involucels many linear acute.

Genus of a few species growing chiefly in the Mediterranean region, and extending to Chili and Brazil.

1. **A. majus,** *Linn.*; *DC. Prod.* iv. 112. Subglaucescent, 1½ ft. high or more; stem terete. Lobes of petals often unequal; stamens not exceeding the petals. Primary rays of the umbel sometimes 2 in. long, slender, and as well as the secondary rays scattered with a few minute serrulate points; secondary rays 1–2 in. long, about equalling the linear acute bracteoles; bracts of the involucre ¾–1 in. long. Fruit $\frac{1}{10}$ in. long.—*A. pauciradiatum,* Hochst. in Hb. Schimp. Abyssin. n. 376.

Nile Land. Abyssinia, fl. September, *Schimper!*
Grows in fresh-ploughed land; perhaps introduced with grain from Egypt, where it is common.
Widely spread throughout the Mediterranean regions.
Abyssinian name *Kuerta-adegi.*

11. **CARUM,** Linn.; Benth. et Hook. f. Gen. Plant. i. 890.

Calyx-teeth obsolete or small; petals oval or obovate, with inflected acumen, entire or bilobed, white or yellow. Stylopods conical or thick. Fruit ovate or oblong, laterally compressed; commissure wide or narrowed; mericarp 5-sided or subterete; primary ridges blunt, somewhat prominent, the lateral ones marginal at the commissure. Vittæ solitary between the ridges, 2 in each commissural face. Carpophore bipartite or bifid. Seed subterete.—Herbs glabrous or the fruit only papillose with scarcely glabrous umbels and hairy petals. Leaves pinnately decompound, with narrow segments. Umbels regularly compound with several or many primary and secondary rays. Involucre of 0, 1, or few bracts, and involucels with 0 or several bracteoles. Flowers usually hermaphrodite.

A considerable genus, widely distributed, and chiefly inhabiting the temperate and subtropical regions of the world.

1. **C. copticum,** *Benth. et Hook. f. Gen. Plant.* i. 891. Pale glaucescent, slender. Stem erect branched, terete, striate, 1–3 ft. high. Leaves multifid with linear segments, the uppermost ones simply pinnatilobed; petioles sheathing. Umbels at the ends of stem and branches with very short hairs on the secondary rays, bracteoles, and sometimes on the bracts; primary rays of fruiting umbels about ½ in. long, secondary rays about 1-10th in. long; involucre and involucels of several linear leaves shorter than the rays. Petals roundly-obovate, bilobed, ciliate on the margins and on the midrib outside, white; filaments about equalling the petals. Fruit ovate, muricate or papillose, 1-12th in. long, contracted at the commissure. Carpophore bifid.—*Ptychotis coptica,* DC. Prod. iv. 108.

Nile Land. Abyssinia, *teste Schweinfurth!*
Occurs also in Egypt and India.

Carum Carvi, L., DC. Prod. iv. 115, Caraway, is cultivated in Abyssinia. It has white flowers, glabrous fruit, and neither involucre nor involucels.

For *Carum Ridolfia,* Benth. et Hook. f. l.c., see note under *Peucedanum graveolens,* Benth. et Hook. f.
It has yellow flowers, glabrous fruit, and neither involucre nor involucels.

12. **SIUM**, Linn.; Benth. et Hook. f. Gen. Plant. i. 893.

Calyx-teeth obsolete; petals oval with an inflected acumen, midrib impressed, emarginate, connivent in bud; stamens exceeding the petals. Stylopods convex, thick, margin entire; style short and contiguous in flower, elongated and spreading in fruit. Fruit shortly ovoid, laterally compressed, subdidymous, contracted at the commissure when ripe; mericarp somewhat pentagonal; primary ridges rather prominent, smooth, lateral ones near the commissure. Vittæ ∞. Carpophore 0. Seeds terete-pentagonal.—Glabrous herbs, growing in marshy or subaquatic places. Leaves pinnate, dentate; umbel regularly compound, terminal and lateral, furnished with many-leaved involucre and involucels.

A genus of a few species, found throughout the Northern hemisphere, and also in South Africa.

1. **S. Thunbergii,** *DC. Prod.* iv. 125. Stoloniferous, 2–3 ft. high; root fibrous; stem erect, striate, angular. Root-leaves a foot long, with petioles 5 in. long, dilated and sheathing at the base; sheath usually auricled or appendaged at apex, 2 in. long; leaflets varying in shape from ovate to oblong, sharply calloso-dentate, narrow and somewhat oblique at base, sessile, $1\frac{1}{2}$–3 in. long; stem-leaves similar but smaller. Fruiting umbels peduncled, of many slender rays, 1–2 in. long; secondary rays many, slender, $\frac{1}{7}$–$\frac{2}{5}$ in. long. Bracts of the involucre several, lanceolate-linear, acute, entire, 1–$1\frac{1}{4}$ in. long; bracteole of the involucels similar, $\frac{1}{7}$–$\frac{1}{4}$ in. long. Fruit glabrous, $\frac{1}{20}$ in. long.

Nile Land. Abyssinia, *Ant. Petit.*
Occurs also in South Africa.

Sium gallabatense, Schweinf. in Beitr. Fl. Æthiop. i. 273, is said to grow in Abyssinia; I have seen no specimen, and am not aware that it has been described.

13. **PIMPINELLA**, Linn.; Benth. et Hook. f. Gen. Plant. i. 893.

Calyx-teeth obsolete; petals ovate or ovate-lanceolate, glabrous or minutely dentate, usually with an acute or blunt point, emarginate or entire, connivent in bud. Disk with thick stylopods, convex or conical, margin entire; styles long or rather short, erect or spreading. Fruit glabrous, papillose or covered with straight or hooked hairs, laterally more or less compressed; commissure wide; primary ridges equal; secondary ridges absent. Vittæ usually alternating with the primary ridges, 2 or more in the commissure of each mericarp, ∞. Carpophore bifid or bipartite. Seed subterete or dorsally compressed. Herbs annual, biennial or perennial. Leaves pinnate or decompound; umbels regularly compound; bracts of the involucre 0 or 1-leaved or in *P. simensis* sometimes many-leaved, of the involucels 0 or of few leaves. Flowers white or slightly purplish.—*Gymnosciadium*, Hochst. Flora 1844, 20.

A large genus, widely scattered over the world.

Fruit glabrous (*Tragoselinum*, DC.).
- Stem manifest. Primary rays of umbel 6–9. Involucre of 1 leaf or 0 . . . . . 1. *P. oreophila.*
- Stem very short. Primary rays of umbel 2–4. Involucre none . . . . . 2. *P. Gymnosciadium.*

Fruit papillose or hairy (*Tragium*, DC.).
- Fruit papillose . . . . . 3. *P. simensis.*
- Fruit covered with hairs.
  - Hairs not hooked. 2–12 in. high . . . . . 4. *P. peregrina.*
  - Hairs hooked. 2–3½ ft. high . . . . . 5. *P. Etbaica.*

1. **P. oreophila,** *Hook. f. in Journ. Linn. Soc.* vii. 195. Pubescent; root perennial. Stem erect or ascending, 2–12 in. high. Leaves pinnate, lower ones 1½–5 in. long, on long slender petioles much dilated and sheathing at base, alternate; leaflets subrotund or narrow, crenate or dentate, sessile or subsessile, sometimes sublobed or incise; lateral leaflets often oblique at base, terminal one usually cordate. Umbels terminal, of 6–9 primary and secondary rays each, on long or manifest peduncles; involucre of 0 or 1 filiform bract shorter than the ray; involucel of 1 or few similar and smaller bracteoles. Petals oval, with inflected acumen, white; filaments about as long as the petals; carpophore bifid. Fruit ovate-oblong, not winged, not more than $\frac{1}{10}$ in. long, glabrous.

Upper Guinea. Fernando Po, 9500 ft. alt., fl. and fr. Dec., *Mann!* Camaroons mountains, 10,000 ft. alt., fl. and fr. Dec. and Jan., *Mann!*

Nile Land. Abyssinia, *Schimper!*

2. **P. Gymnosciadium,** *Hiern.* More or less pubescent, perennial. Root perennial; stem scarcely any. Leaves subradical, pinnate, of various lengths up to 6 in.; leaflets few, subrotund, crenate, sessile, terminal one deeply cordate, 3–6 in. wide; venules numerous; petioles long, dilated laterally and membranaceous towards the base with several parallel veins. Peduncle of umbel subradical, 1–4½ in. long, slender; primary rays 2–4, usually 3, 1–2 in. long, nearly equal; secondary rays 8–13, outer ones about $\frac{1}{8}$ in. long, the inner ones shorter. Petals white (?). Involucre and involucel absent. Fruit squamosely hairy when young, glabrous (?) when ripe, $\frac{1}{10}$ in. long.—*Gymnosciadium pimpinelloides*, Hochst. l.c.

Nile Land. Abyssinia, fl. June, *Schimper!*

3. **P. simensis,** *Benth. et Hook. f. Gen. Pl.* i. 895. Glabrous. Root thick. Stem erect, branched, striato-terete, 1–2 ft. high or more, reddish towards the base. Leaves pinnate, lanceolate, ascending, ranging up to 3½ in. long, with pinnatifid, ovate or lanceolate-acute pinnæ; lobes serrate or incise; petioles dilated and sheathing. Umbels terminal, on long peduncles, with many rather unequal primary rays 1–2 in. long and several secondary rays $\frac{1}{7}$–$\frac{1}{10}$ in. long. Involucre very variable, shorter than half the rays, with 1, few or several lanceolate-linear or dissected bracts, varying much in different specimens both in size and development; involucels of several lanceolate bracteoles about

equalling or shorter than the secondary rays. Calyx-lobes obsolete; petals oval with blunt inflexed point, white; filaments exceeding the petals. Stylopods conical with dilatato-undulating margins. Fruit shortly ovoid, verrucoso-papillose, with distant primary ridges, laterally compressed, $\frac{1}{12}$ in. long. Vittæ ∞, 2 or 3 in the wide intervals of the ridges, 2 in the commissural face of each mericarp. Carpophore bipartite.—*Helosciadium simense*, Hochst. in Hb. Schimp. Abyss.; *Sium simense*, Gay in Rich. Fl. Abyss. i. 324; *Conium verrucosum*, Hochst. in Pl. Schimp. Abyss.; *Sium verrucosum*, Gay in Rich. Fl. Abyss. i. 324.

Nile Land. Abyssinia, by mountain-streams. Flowers and fruits in August and September. *Schimper! Plowden!*

Abyssinian names, *Kerounta, Zakeda, Antuohana.*

4. **P. peregrina,** *Linn.*; *Sp. Pl. ed.* 4, 378; *DC. Prod.* iv. 121; *Rchb. Ic.* t. 1866. Pubescent or subglabrous, biennial; stem erect, 2–3½ feet high, terete-striate, usually purplish towards the base, glaucescent. Radical-leaves pinnate with subrotund, crenate, membranaceous leaflets, the terminal one cordate, about 6 in. long; stem-leaves pinnate or pinnatisect; segments ovate or lanceolate, serrate or laciniate; petioles long or manifest, sheathing; umbels terminal on long or manifest peduncles, with 10–13 primary rays more than an inch long in fruit, each with about as many secondary rays $\frac{1}{8}$ in. long in fruit; involucre and involucels absent. Petals ovate with a long inflected acumen and then emarginate, minutely toothed, white; midrib reddish. Stylopods conical; styles slender, erect-patent or more usually spreading. Fruit ovoid, hairy when young, hispid when mature, somewhat compressed laterally; mericarp somewhat pentagonal in transverse section, primary ridges blunt, $\frac{1}{120}$ in. long; hairs not hooked. Vittæ alternate with primary ridges, but 2 in each commissure. Carpophore bifid.—*P. hirtella*, A. Rich. Fl. Abyss. i. 323; *Tragium hirtellum*, Hochst. in Hb. Schimp. Abyss. n. 355.

Abyssinian name *Mazogo.*

Nile Land. Abyssinia, Mt. Scholoda; fl. Oct., *Schimper!*

Grows in thickets.

The Abyssinian specimens differ from the type by the styles usually spreading or recurving instead of being erect patent, as is common in the type.

Occurs also in South Europe, the Levant, Caucasus, Egypt, &c.

5. **P. Etbaica,** *Schweinf. in Verh. Zool. Bot. Wien.* sér. i. 667. Annual. Quite glabrous except the fruit and sheaths of petioles. Stem erect, finely striate, glaucescent, erect or ascending, 2–12 in. high. Radical leaves on long petioles, pinnately tripartite; segments stalked, doubly trifid; lower stem-leaves 5-pinnate-partite, segments divaricate, stalked, tripartite, partitions doubly trilobed, lobes oblong or linear acute and mucronulate; upper leaves shortly stalked, tripartite, with linear segments, trifid or entire; petioles long or manifest, sheathing at the base; sheaths narrowed, whitish, membranaceous, slightly webbed-ciliate. Umbels long-stalked, of 3–7 primary rays, $\frac{1}{3}$–$\frac{2}{3}$ in. long, each of 7–12 secondary rays, $\frac{1}{10}$ in. long, somewhat hairy or at length gla-

brous. Petals white or violet-purplish, rounded at the apex or rarely emarginate. Fruit ovate, densely covered with much-hooked hairs, $\frac{1}{20}$ in. long; styles rather short; stigmas capitate. Vittæ 5 in each mericarp.

Nile Land. Nubia, Soturba, *Schweinfurth !*

Very like *P. arabica*, Boiss., but with more densely hairy fruit than in the rather young specimens that I have seen of the latter.

14. **ANTHRISCUS,** Hoffm.; Benth. et Hook. f. Gen. Plant. i. 899.

Calyx-lobes obsolete; petals oval, with a shortly inflected acumen, nearly entire, white; stylopods flat or conical. Fruit ovate-oblong, glabrous, with inconspicuous primary ridges, somewhat attenuate at the apex; mericarps subterete or somewhat dorsally compressed. Vittæ slender, often unequal and irregular; carpophore undivided or bifid. Seed subterete, with a wide and deep furrow on inner face.—Glabrous or hairy, erect, branching herbs. Leaves pinnately or subternately decompound. Involucre 0; involucels of 0 or several leaves.

Genus of a few species, growing chiefly in the temperate and subtropical parts of the Northern hemisphere of the Old World.

Primary and secondary rays of umbel several. Involucels of several bracteoles. Leaves several times pinnate	1. *A. sylvestris.*
Primary rays of umbel 3 or 4, secondary rays 3–5. Involucels 0. Leaves 3 or 5-foliate	2. *A. africana.*

1. **A. sylvestris,** *Hoffm.; DC. Prod.* iv. 223. Stem terete, striate, glabrous or pilose, 2–3 ft. high. Radical leaves 3 or 4 times ternate, segments ovate-pinnatifid, glabrous or pilosely pubescent, on long petioles, dilated and sheathing towards base, 1–2 ft. long; upper leaves on short dilated and sheathing petioles, smaller. Umbels lateral and terminal, of several primary and secondary rays; primary rays about 1 in. long, secondary rays $\frac{1}{5}$–$\frac{1}{4}$ in. long. Leaves of the involucels many, lanceolate, glabrous or ciliate; many flowers in the secondary umbels abortive. Petals unequal. Fruit smooth or with a few very faint tubercles, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Vittæ about 9 in each mericarp; carpophore bifid at the apex or to the middle. Pedicels with a few short caducous hairs at the apex, seen at the base of carpophore.—*Chærophyllum affine,* Steud. in Rich. Fl. Abyss. i. 332.

Nile Land. Abyssinia, *Schimper !*

Widely spread in Europe and North Asia.

Grows in damp mountainous places. Flowers and fruits in June.

2. **A. africana,** *Hook. f. in Journ. Linn. Soc.* vii. 195. Root perennial. Stem shining, terete, sulcate, 1–4 ft. high, simple and pubescent at the base, with divaricate slender glabrous branches above. Root-leaves about 6 in. long, 3- or 5-foliolate, on long pilose petioles sheathing at the base, with stalked widely ovate cordate irregularly dentate and sublobed retrorsely hispid leaflets, 1–2 in. long, the lateral ones often oblique at the base. Stem-leaves with gradually shortening petioles,

the leaflets gradually narrowing till they become linear-lanceolate and narrowed at the base, the lateral leaflets rarely bifoliolate. Umbels with 3–4 primary rays, 1½–2 in. long, each with 3–5 secondary rays, nearly or quite 1 in. long; paniculately arranged at the ends of the stem and branches. Involucels 0. Flowers small. Fruit ⅙ in. long. Vittæ about 2, alternating with each of the primary ridges; stylopods elongated, conical; styles recurved, filiform; carpophore undivided.

Upper Guinea. Cameroons mountains, 4000–7000 ft.; fl. and fr. Dec.—Feb. *Mann!*

15. **DIPLOLOPHIUM**, Turcz.; Benth. et Hook. f. Gen. Plant. i. 900.

Calyx-teeth obsolete; petals ovate with long inflected acumen, emarginate, hairy outside; filaments longer than the petals. Stylopods convex or conical, with 3 ridges and at base 5-lobed, glabrous. Fruit cylindrical, tomentose-hirsute, subterete or somewhat compressed dorsally; primary ridges rounded; carpophore 0 (?); styles rather long, channelled within; stigmas punctiform. Vittæ solitary between primary ridges, and 2 or 4 in each commissural face, conspicuous. Seeds dorsally compressed.—Stout perennial herbs, with erect, solid, terete and finely striate stems, glabrous except the umbels. Stem-leaves ternato-pinnately decompound with filiform or acicular subcylindrical or compressed segments. Petioles wholly dilated and sheathing. Umbels regularly compound of many primary rays converging in fruit, and many secondary rays, terminal or subterminal on long or manifest stalks. Involucre of many lanceolate or lanceolate-oblong bracts, connate at the base, quickly glabrescent; involucels of many lanceolate bracteoles, connate at the base, as long as the pedicels. Receptacles of primary and secondary rays more or less dilated and thickened; outer primary rays longer than the inner ones.

Segments of leaves filiform. Bracts of involucre wide and long;
2 vittæ in each commissural face . . . . . 1. *D. abyssinicum.*
Segments of leaves acicular. Bracts of involucre small or narrow; 4 vittæ in each commissural face . . . . . 2. *D. zambesianum.*

1. **D. abyssinicum,** *Benth. et Hook. f. l.c.* Stem glaucescent, 2–5 ft. high. Leaves 2–12 in. long, with very numerous spreading filiform acute segments. Petioles 1–5 in. long by ⅓–⅔ in. wide. Primary rays of umbel 1–1½ in. long, stout, pubescent; secondary rays $\frac{1}{10}$–$\frac{3}{10}$ in. long, pubescent. Bracts of the involucre 1 in. long or more, and $\frac{1}{10}$–$\frac{3}{10}$ in. wide; involucels $\frac{3}{10}$–½ in. long, pubescent. Flowers rather large, hermaphrodite. Petals equal, midrib impressed. Fruit ⅕ in. long, with long styles; hairs everywhere short.—" Whole plant, usually perfumed (something like peppermint), in woods," Speke and Grant.—*Cachrys abyssinica*, Hochst. in Hb. Schimp. Abyss. n. 213. *Diplolophium africanum*, Turcz. in Bull. Mosc. 1847, i. 173.

Nile Land. Abyssinia, fr. Jan. *Schimper!* 7500 ft. alt. Upper Nile, *Speke and Grant!* No. 709; fl. November and December; 3° N. lat. Æthiopia, Fesoglu, *Kotschy!*

2. **D. zambesianum,** *Hiern.* Glaucescent; about 4 feet high. Stem-leaves $1\frac{1}{2}$–5 in. long; segments acicular; petioles 1–3 in. long, expanded, sheathing at the base. Primary rays of the umbel $\frac{2}{3}$–$1\frac{2}{3}$ in. long, rigid, glabrous; secondary rays $\frac{1}{5}$–$\frac{4}{10}$ in. long. Bracts of the involucre glabrous, $\frac{1}{3}$–$1\frac{1}{4}$ in. long by less than $\frac{1}{10}$ in. wide, acute, shorter than the outer primary rays. Involucels $\frac{1}{5}$–$\frac{1}{4}$ in. long. Petals equal, $\frac{1}{10}$ in. wide. Styles reflexed over the tops of the mericarps; stylopods depresso-convex; 4 vittæ in each commissural face. Fruit $\frac{1}{5}$ in. long.

South Central. Highlands of Batoka country, *Dr. Kirk!* 3000 ft. alt. Flowers and fruits in July.

16. **FERULA,** Linn.; Benth. et Hook. f. Gen. Plant. i. 917.

Calyx-teeth rather prominent, small. Petals ovate, with inflected lanceolate acumen, slightly emarginate, nearly equal. Stamens with filaments longer than the petals. Disk flat, with narrow undulating margin. Fruit oval, dorsally much compressed. Primary ridges 5, blunt except the marginal ones, which are winged, 3 (or rarely 2) being plainly visible on each dorsal face. Vittæ about 3 between each primary ridge, and 4 on the commissural face; carpophore bipartite. Seeds dorsally compressed, somewhat concave.—Perennial glaucescent herbs. Leaves highly decompound with filiform segments. Petioles of the upper leaves much dilated, sheathing. Umbels regularly compound, of many primary and secondary rays, terminal, subterminal, and lateral. Involucre and involucels none or of few caducous leaves. Flowers yellow, polygamous.

A large genus, inhabiting South Europe, Western and Central Asia, and North Africa.

1. **F. communis,** *Linn.; DC. Prod.* iv. 172. Stem terete, striate, thick, 4–8 ft. high, with reddish spots or patches. Leaves widely spreading, the lower ones large. Petioles much dilated, membranous, sometimes 6 in. long and 1 in. wide, auricled or sagittate at apex. Root-leaves on very long petioles, which gradually expand into sheaths. Central umbels on peduncles about $\frac{1}{2}$ in. long, bearing hermaphrodite flowers; lateral umbels barren on peduncles 3–$3\frac{1}{2}$ in. long, in the axils of the uppermost leaves, which are nearly or quite reduced to sheathing petioles. Primary rays nearly equal, about $1\frac{1}{4}$ in. long; secondary rays about $\frac{1}{3}$ in. long. Fruit scarcely $\frac{1}{2}$ in. long by $\frac{1}{4}$ in. broad.—*Ferula abyssinica,* Hochst. in A. Rich. Fl. Abyss. i. 326.

Nile Land. Abyssinia, *Schimper!* 6000–7000 ft. alt. Fl. and fr. November.

Occurs also in Algeria, on the shores of the Mediterranean Sea, and in Western Asia.

The young stems when cooked are eaten in Abyssinia.

Abyssinian names, *Diéhgo, Dgog, Deok.*

17. **PEUCEDANUM,** Linn.; Benth. et Hook. f. Gen. Plant. i. 918.

Calyx-teeth obsolete or small. Petals lanceolate, oval or obovate, with inflected acumen, emarginate or nearly entire. Margin of the

disk flattened, wavy; stylopods small or long and conical. Fruit oval or obovate, much compressed laterally, with winged margins, convex on the back. Primary ridges on the back of the fruit, all or 3 interior ones, conspicuous, glabrous, often with filiform less conspicuous, intermediate ridges. Carpophore bipartite or bifid. Vittæ solitary or 2 or 3 together between the primary ridges, 2 or 4 in the commissural face of each mericarp. Seeds compressed, plane or sulcate on the face.—Glabrous or occasionally hairy, usually glaucescent and perennial herbs, or glaucous and glabrous shrubs or even trees. Leaves pinnately decompound or pinnate. Umbels regularly compound. Involucre of 0, 1, or few leaves; involucels of few or several leaves. Flowers white, yellow, or rarely purplish, polygamous, those of the central umbels usually perfect.

A large genus, inhabiting also Europe, Asia, S.W. Tropical America, and South Africa.

Herbs. Fruit oval, much compressed dorsally throughout.
  Leaves bi- or multi-pinnate.
Petals white or yellowish. Fruit pale.
  Vittæ solitary between the primary ridges.
    Leaves without conspicuous veins.
      Segments of leaves setaceo-linear . . . . . 1. *P. graveolens.*
      Segments of leaves linear . . . . . 2. *F. silaifolium.*
      Segments of leaves oval or ovate . . . . . 3. *P. Petitianum.*
    Leaves with pale principal veins . . . . . 4. *P. altum.*
  Vittæ 2 or 3 together between the primary ridges . . . . 5. *P. Grantii.*
Petals and fruit purplish . . . . . 6. *P. atropurpurea.*
Trees. Fruit obovate, much compressed but thickening upwards with strong disk.
Leaves simply pinnate. Vittæ ∞. (*Steganotænia*).
  Leaves irregularly denticulate; leaflets ovate-lanceolate, acuminate at both ends . . . . . 7. *P. araliaceum.*
  Leaves serrato-setose; leaflets ovate-acuminate at apex, not attenuate at base . . . . . 8. *P. fraxinifolium.*

1. **P. graveolens,** *Benth. et Hook. f. Gen. Plant.* i. 919. Glabrous erect glaucescent annual herb, 1 to 2 ft. high or more. Root fusiform, whitish brown. Stem terete, finely striate, pale, branched above, slender. Leaves decompound with setaceo-linear lobes. Petioles wholly dilated and sheathing. Umbels at the ends of stem and branches, of many primary rays, $1\frac{1}{4}$ to $1\frac{3}{4}$ in. long in fruit, each of many secondary rays $\frac{1}{6}$–$\frac{1}{3}$ in. long. Involucre and involucel none. Flowers yellow. Calyx-teeth obsolete. Petals oval, with long inflected blunt point, nearly entire. Stamens exceeding petals. Stylopods depressed; styles short, reflexed. Fruit oval-oblong, glabrous, dorsally compressed, $\frac{1}{6}$ in. long. Primary ridges equidistant, prominent, the lateral ones winged when ripe. Vittæ solitary between the ridge, and 2 in each commissural face.—*Anethum graveolens*, Linn.; DC. Prod. iv. 186; Rchb. Ic. t. 1968.

Nile Land. Abyssinia, *Petit! Schimper*, 6000 ft. alt.
Tigre name, *Silan.*

A. Richard in Fl. Abyss. i. 329, reports *Anethum segetum*, L., DC. Prod. iv. 186, *Carum Ridolfia*, Benth. and Hook. f. Gen. Pl. i. 891, from Abyssinia, as collected by

Quartin-Dillon, Ant. Petit, and Schimper, some specimens of which Hochstetter (in Pl. Schimp. Abyss. sect. i. 379, sect. ii. 1879) had previously named *A. graveolens*, L. Richard says that this species is known in Abyssinia by the names *Sadanskoa* and *Chelone*. The only marked difference between these species consists in the fruit, which in *A. segetum* is laterally compressed, and without lateral wings.

2. **P. silaifolium,** *Hiern*. Glabrous and shining except in protected parts above, herbaceous, pale, 2½ ft. high. Root thick. Stem deeply striate, erect; branches several from the base, branched again above. Root-leaves about 10 in. long, on long petioles, clasping at base, glaucous, lanceolate in outline, bipinnate; pinnæ and pinnules stalked; segments biternato-partite with linear acute lobes; upper smaller, similar, erect. Umbels on erect or ascending peduncles somewhat glandular-hairy at apex, terminal and subterminal; primary fruiting rays 8–12, 1–1½ in. long, and as many secondary rays $\frac{3}{10}$–$\frac{2}{5}$ in. long; involucre and involucel of few small leaves. Petals lanceolate with inflected acumen, emarginate. Fruit oblong, $\frac{1}{3}$–$\frac{1}{2}$ in. long by $\frac{1}{5}$ in. wide, broadly winged, with 3 rather broad rounded conspicuous contiguous ridges and 2 exterior less conspicuous and smaller ones, slightly indented at both ends. Stylopods convex, exceeding the lateral wings of the fruit. Carpophore bifid. Vittæ solitary between the ridges and wings; 2 rather distant ones in each commissural face. Seeds plane on the face.

Nile Land. Abyssinia, *Schimper!* Coll. 1863–8; 8200 ft. alt.; fl. and fr. August.

3. **P. Petitianum,** *A. Rich. Fl. Abyss.* i. 327. Perennial herb, 2½–4 ft. high. Root thick. Glaucescent, glabrescent except in places about the upper part and inflorescence which are glandular-hairy. Stem terete, striate, branched and usually geniculate above. Leaves tripartito-pinnatisect on manifest petioles, dilated and amplexicaul at the base; pinnæ stalked; segments narrowly oval or ovate, incise and serrate, the lower ones often with an exterior lobe; slightly hairy but quickly glabrescent. Umbels at the ends of the stem and branches, of many primary and secondary rays (peduncled). Primary fruiting rays 1–2 in. long, secondary $\frac{1}{5}$–$\frac{2}{5}$ in. long; involucre and involucels of few small leaves. Flowers white. Fruit oval, broadly winged at the margins, marked on the back with much raised ridges, and 2 exterior less conspicuous ridges, $\frac{3}{10}$–$\frac{2}{5}$ in. long by $\frac{1}{5}$–$\frac{1}{4}$ in. wide, emarginate at both ends. Stylopods small on the fruit, convex with recurved short styles, exceeding the wings of the fruit; disk annular, undulated. Carpophore bipartite. Vittæ solitary between the ridges and wings, 2 rather distant ones in each commissural face. Seeds slightly sulcate along the middle of the face.

Nile Land. Abyssinia, *Schimper!*
Upper Guinea. Fernando Po, Clarence Peak, 9000–9500 ft. alt.; fl. in December, fr. in April, *Mann!*

4. **P. altum,** *Hiern*. A nearly glabrous subglaucescent herb, 8–15 ft. high, with several terete striate branches. Root perennial, thick,

divided. Leaves bipinnate, large, with dilated sheathing petioles, stalked pinnæ, and ovate-incised or sublobed shortly stalked pinnules; segments rounded or obtuse, often shortly mucronate; principal veins slender, clear, scattered with a few short bristles, in relief on both sides and of a paler colour than the leaves; the net-veins darker; the stalks shortly and inconspicuously pilose. Umbels peduncled, with many rather slender primary and secondary rays, and involucre and involucels of few short linear leaves. Primary rays of fruiting umbel 2 in. long, secondary $\frac{1}{2}$ in. long. Calyx-teeth minute; petals shortly oval, emarginate. Styles short; stylopods convexo-conical. Fruit obovate-oblong, glabrous; primary ridges all equally conspicuous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, $\frac{1}{7}$ in. wide. Vittæ large and solitary between the ridges 2 not distant in each commissural face. Seed concave on the face, with 3 ridges on the back.

Nile Land. Abyssinia, Gafat, *Schimper!* 1863–68; 8700 ft.; fl. and fr. October.

5. **P. Grantii,** *Kingston mss.* Glabrous and nitescent, herbaceous Root tapering. Stem terete, striate, $1\frac{1}{2}$–7 ft. high, branched especially above, sometimes as thick as a walking-stick. Lower leaves bipinnate, on long petioles, dilated and clasping at base; pinnæ distinctly stalked; pinnules sessile, ovate or ovate-lanceolate, acute, cuneate at base, incise-serrate; upper leaves usually ternate on petioles more or less dilated throughout their entire length; veins of all the leaves pale, delicate, but very prominent on the under side. Umbels on manifest peduncles, numerous, arranged in a paniculate manner, middle ones often subumbellate; primary rays $\frac{1}{2}$–$\frac{4}{5}$ in. long; secondary $\frac{1}{7}$–$\frac{1}{5}$ in. long. Involucre of 0 or 1 small bract, involucel of several small bracteoles. Calyx-lobes obsolete. Petals lanceolate, with inflected point, subentire; stamens longer than the petals; stylopods convex with sharp overhanging disk; styles very short in flower. Fruit much compressed dorsally with 3 rounded ridges on the base, winged on the margins, obovate-oblong, $\frac{1}{3}$ in. long. Vittæ 2 or 3 together, 4 in commissural faces. Carpophore bipartite. Seed somewhat convex on back, with a wide central trench on commissural face.

Nile Land. Abyssinia, *Schimper!* White Nile, fl. and fr. in December, *Petherick!* Unyoro, fl. in August, *Speke and Grant!* 581.
Grows in woods.

6. **P. atropurpureum** (*Pastinaca*), *Steud. in A. Rich. Fl. Abyss.* i. 329. Glabrous. Stem terete, finely striate. Flowers purple. Petals obovate concave with inflected acumen. Involucre and involucels of 0, 1 or 2 bracts with lanceolate subulate segments. Fruiting umbels of about 7 primary and secondary rays, about 1 in. and $\frac{1}{4}$ in. long respectively. Stylopods depressed. Fruit purplish? glaucous, narrowly elliptic, compressed, immature $\frac{1}{5}$ in. long in our specimens.

Nile Land. Abyssinia, *Schimper!*
Grows in shady places, and flowers in September.

7. **P. araliaceum,** *Benth. et Hook. f. Gen. Plant.* i. 920. A small glabrous tree, with terete stem and branches. Leaves pinnate, crowded

at the ends of the barren branches, about 1½ ft. long, bearing at least 9 leaflets; leaflets ovate-lanceolate, attenuate at both ends, shortly stalked, 3–5 in. long by 1–2 in. wide, irregularly denticulate; teeth sometimes mucronate; middle and lateral veins clear, raised on both sides; net-veins crowded, areolar, pellucid, depressed on both sides; lateral leaflets often oblique at the base, sometimes decurrent on one side, and rarely with one deep lateral lobe; petioles long, subterete, clasping at the base with a short sheath. Peduncles of the umbels with bract at the base, about 4 together arranged in a subumbellate manner at the ends of the branches, the central one 1–1½ in. long, shortest and thickest, the lateral ones 4–6 in. long. Umbels with numerous primary and secondary rays; primary fruiting ray of central umbels 1½–2 in. long; secondary $\frac{3}{10}$–$\frac{2}{5}$ in. long; lateral umbels smaller, usually barren; bracts of involucre and involucels linear-lanceolate or subulate, short, deciduous. Flowers white. Styles in fertile flowers long, slender. Fruit obovate-oblong, $\frac{2}{5}$ in. long by $\frac{1}{4}$ in. wide, cordate-truncate at base, widely subcordate at apex, broadly winged, the part not winged thickening upwards and terminating in a flat firm disk; 3 primary ridges prominent, slender. Vittæ several between primary ridges, 4 in the commissural face of each mericarp.—*Steganotænia araliacea*, Hochst. in Flora 1844, app. 4.

Nile Land. Abyssinia, *Schimper!* Fruits in April.
Abyssinian name, *Endur Guchila.*

8. **P. fraxinifolium,** *Hiern.* A glabrous tree with terete stem and branches. Leaves pinnate, crowded near the ends of the barren branches, 8–12 in. long, bearing usually 9 leaflets; petioles less than half the whole length of the leaves; leaflets ovate-acuminate, often cordate at base, subsessile or shortly stalked, irregularly serrato-setose; lateral ones oblique and subfalcate; venation as in *P. araliaceum*, but less conspicuous and depressed on upper side. Umbels at ends of branches arranged on peduncles, 6–8 together in a subumbellate manner, about 5 in. long, which usually bear 2 umbels, one about 1 in. distant above the other; primary fruiting rays 1–1½ in. long, secondary $\frac{1}{7}$–$\frac{1}{4}$ in. long. Styles very short in flower, long and slender in fruit. Bracts of involucre and involucel lanceolate, deciduous. Fruit obovato-oblong, widely cordate at apex, subcordate at base, broadly winged, thickening upwards and terminating in a flat firm disk, $\frac{1}{2}$ in. long by $\frac{1}{4}$–$\frac{1}{3}$ in. wide; 3 primary ridges prominent, slender. Vittæ several, between the primary ridges, 6 (?) in the commissural face of each mericarp. Disk and anthers yellow. Var. β. *petiolulata.* Leaflets not 2 in. long, stalked, lower petiolules $\frac{1}{7}$–$\frac{1}{5}$ in. long. Fruit narrower.—*Steganotænia araliacea*, Hochst. var. α, A. Rich. Fl. Abyss. i. 328.

Lower Guinea. Congo, *Chr. Smith!*
Nile Land. Abyssinia, Amba Sea, fl. May, 6000–7000 ft. alt., *Schimper!* (a form with 7-foliolate leaves, and leaflets caudate-acuminate, setose, shortly petiolulate). Madi woods, fl. in December, *Speke and Grant!* 639. "*Steganotænia*, sp. a forest tree," *Speke and Grant*, Nile Journal, 635.

Mozamb. Distr. Maganja hills, 3000 ft. alt., *Meller!*

Var. β. **Nile Land.** Abyssinia, *Schimper!* Coll. 1863–8. *n.* 923.

Alvardia arborescens, Fenzl in Flora 1844, p. 312 (name only), *Peucedanum, teste* Benth. and Hook. f. Gen. Pl. i. 920, was found by Kotschy in the kingdom of Fesoglu; I have seen it only in flower without leaves. It appears to be a distinct species. There is a specimen, 3 in. thick, in the St. Petersburgh museum. It fruits in May.

A specimen of a *Peucedanum* (*Steganotænia*), collected by Barter in the Niger Expedition, has nearly entire stalked ovate-lanceolate acuminate leaflets, widened to near the base, 7 on one leaf. It is probably a new species nearly related to *P. araliaceum*.

Abyssinian name, *Antrokohela.* Manganja name, *M'Polonć.* White Nile name, *Meonga Pembe.*

18. **LEFEBURIA**, A. Rich.; Benth. et Hook. f. Gen. Plant. i. 921.

Calyx-teeth obsolete; petals narrowly cuneate or oblanceolate, acumen inflected, entire. Stylopods conical or long and narrow, not dilated at the base, ½-connate or free. Fruit obovato-elliptic, flat, dorsally compressed, winged at the margin; wings with a deep narrow sinus at apex, not thickened; primary ridges 5, dorsal delicate; vittæ solitary, conspicuous between the primary ridges; 2 distinct vittæ in each commissural face. Carpophore bipartite. Seeds flat.—Erect glabrous, perennial herbs with terete stems. Leaves ternately divided, lower ones on long petioles, sheathing and amplexicaul at base, upper ones simpler; leaflets simple or subpartite, lanceolate, acute, attenuate at both ends, distantly serrate or very finely serrulate. Umbels terminal and subterminal, of several or many long slender rays and many slender shorter secondary rays; involucre 0 or of several delicate short bracts; involucels of a few similar bracteoles.

The genus contains only the two following species :—

Primary rays 12–16. Stylopods ½-connate, very narrow. Seeds sulcate on face	1. *L. abyssinica.*
Primary rays about 8. Stylopods free, conical. Seeds flat on the face	2. *L. brachystyla.*

1. **L. abyssinica,** *Rich. in Ann. Sc. Nat.* sér. 2, xiv. 260, t. xv. fig. 1; *Fl. Abyss.* i. 328, t. lv. Glaucescent, 2–3 ft. high. Root leaves triternate, 2 ft. long; uppermost leaves nearly reduced to dilated petioles about 1 in. long; leaflets coarsely and distantly serrate, serratures apiculate. Umbels arranged on peduncles in a corymbose manner, the central one only fertile; primary rays of fruiting umbels many, 3½–4½ in. long; secondary nearly 1 in. long, ascending, filiform; receptacle of rays somewhat dilated. Stylopods narrowly conical, longer than the notch in the wings of the fruit, connate from the middle downwards. Fruit 4 in. long by 3 in. wide; pedicels dilated at articulation with fruit. Seeds with a medial depressed line on the face.

Nile Land. Abyssinia, *Schimper!* Fruits in November.

2. **L. brachystyla,** *Hiern.* Subglaucescent, 3 ft. high. Stem-leaves ternate with lanceolate-linear leaflets, minutely and distantly serrulate, 4–8 in. long, on manifest petioles sheathing at the base. Primary

rays about 8, 2½ in. long. Receptacle of rays scarcely dilated; secondary rays ½–¾ in. long. Stylopods conical, free, not exceeding the notch of the fruit; styles recurved. Fruit ⅓–½ in. long by ¼–⅓ in. wide; pedicels dilated at articulation with fruit. Seeds flat on the face.

Nile Land. Upper Nile, Province Unyamuezi. In marsh or backwater by R. Wallah, 5° S. lat., 33° E. long.; alt. 3800 ft., *Speke and Grant!*

19. **MALABAILA,** Hoffm.; Benth. et Hook. f. Gen. Plant. i. 923.

Calyx-teeth minute; petals oval, with a filiform inflected acumen, emarginate, slightly hairy outside. Filaments longer than the petals. Stylopods convex-conical; surrounded by a slightly waved margin. Fruit obcordate-oblong, flatly and dorsally compressed, surrounded by a wide somewhat thickened margin, cordate at the apex, with the stylopods in the notch, which extends about as high as the margin of the fruit, glabrous, wider at base than the pedicel; primary ridges delicate, except the winged marginal ones. Vittæ solitary between the primary ridges, equal, reaching ⅔ way down the fruit, broad, clearly seen from outside; 2 vittæ in each commissural face. Carpophore bipartite. Seed flat.—Perennial erect tall herbs. Leaves pinnate, with incise-dentate ovate usually acute pinnæ. Umbels terminal and subterminal, regularly compound, of several primary and many secondary rays; involucre of 0, 1 or few bracts, and involucels of many linear-acute bracteoles.

A genus of a few species occurring in Eastern Africa, South-east Europe, and Western Asia.

1. **M. abyssinica,** *Boiss. in Ann. Sc. Nat.* Sér. 3, Pl. i. 338. Glandular-pubescent in upper part, hairy below. Stem terete, striate, 2–3 ft. high. Root-leaves more than a foot long, on petioles 6 in. long clasping at base; lower leaves 4–6 in. long, on petioles 2–3 in. long, dilated into a clasping sheath about 1–2 in. long. Outer primary rays of fruiting umbels 2–3½ in. long; secondary rays ⅕–3/10 in. long. Fruit ⅖–⅗ in. long by ¼–⅖ in. wide.—*Peucedanum* (*Cervaria*), Hochst. in Hb. Schimp. Abyss. n. 204.

Nile Land. Abyssinia, *Schimper! Quartin-Dillon and Petit* (?); 8000 ft. alt.; fr. Nov., *Schimper.*

Abyssinian name, *Mokuessa.*

20. **DAUCUS,** Linn.; Benth. et Hook. f. Gen. Pl. i. 928.

Calyx-teeth acute; petals unequal, obovate, with inflected acumen, deeply emarginate, or the larger ones bilobed. Stylopods shortly conical. Fruit ovoid, somewhat compressed laterally or subterete; 5 primary ridges not prominent, with 2 faint rows of short thin patent hairs; 4 secondary ridges very prominent, armed with long spines hooked at the end or glochidiate. Vittæ solitary under the secondary ridges, and 2 contiguous in the commissural face of each mericarp. Carpophore undivided. Seed sub- or ½-terete, somewhat hollowed in

the middle of the face, but not deeply sulcate.—Annual or biennial herbs with pinnately decompound leaves. Umbels regularly compound; involucre and involucels of several dissected or linear leaves.

A large genus, chiefly Mediterranean, and extending to temperate Asia and North Africa, America, and Australia.

Umbels stalked . . . . . 1. *D. Carota.*
Umbels sessile . . . . . 2. *D. abyssinica.*

1. **D. Carota,** *Linn.; DC. Prod.* iv. 211. Erect, hispid, biennial. Leaves 2 or 3 times pinnate, with small or linear acute segments. Umbels terminal on long peduncles of many crowded primary and secondary rays; involucre of many crowded leaflike bracts, and involucels of many linear or trifid acute bracteoles. Fruit $\frac{1}{8}$ in. long; spines of the fruit shorter than its thickness.—*Daucus abyssinicus,* C. A. Mey. in Index Hort. Petrop. ix. 68.

Nile Land. Abyssinia, *Schimper!* fl. and fr. December.
Occurs also widely distributed in Europe, temperate Asia and India, N. Africa, and introduced in N. America and Australia.
Abyssinian name, *Kuerta adagi.*

2. **D. abyssinicus,** *Hochst. in A. Rich. Fl. Abyss.* i. 331, *non C. A. Mey.* Annual, $\frac{1}{2}$–1 ft. high, erect, with scattered setose hairs, but shining. Stem terete, striate. Leaves oblong or ovate, the lower ones on long petioles terete except at the clasping base; segments linear-acute. Umbels sessile, opposite the leaves, of few- often 1-flowered rays. Fruiting rays $\frac{1}{5}$–$\frac{1}{3}$ in. long. Involucre of linear-acute bracts; petals whitish-rose colour. Fruit with minutely glochidiate spines on the secondary rays longer than the thickness of the fruit, $\frac{1}{5}$ in. long by $\frac{1}{15}$ in. thick; spines $\frac{1}{10}$ in. long.—*Caucalis abyssinica,* Hochst. in Hb. Schimp. Abyss. sec. i. 338. *Durieua abyssinica,* Boiss. in Ann. Sc. Nat. sér. 3, ii. 51.

Nile Land. Abyssinia, *Schimper!* Fr. October.

21. CAUCALIS, Linn.; Benth. et Hook. f. Gen. Plant. i. 928.

Calyx-teeth rather prominent, lanceolate-acute or obsolete. Petals usually unequal, oval, with inflected acumen; stylopods thick. Fruit ovoid, somewhat compressed laterally and narrowed at the commissure; 5 primary ridges not prominent, filiform or wider, covered with short appressed bristles; 4 secondary ridges predominating, armed with longer patent bristles, glochidiate or forked at the end. Vittæ solitary under secondary ridges. Carpophore undivided or 0. Seed subterete, deeply sulcate on the face.—Annual or biennial herbs. Leaves pinnately decompound. Umbels of few rays or subcapitate small, terminal or opposite the leaves. Involucre of 0, 1, or several bracts; involucels of many bracteoles. Flowers white or dark purple.

A moderate sized genus, chiefly found in the Mediterranean region, but some species are widely scattered over the world.

Umbels terminal of few manifest rays, with 0 or 1 bract in the involucre. Flowers white	1. *C. infesta.*
Umbels opposite the leaves, subcapitate with several bracts in the involucre. Flowers dark purple	2. *C. melanantha.*

1. **C. infesta,** *Curt.; Fl. Lond.* ed. 1, Fasc. 6, t. 23. Annual or biennial herb. Stem erect, slender, branched, terete, finely striate, glabrous at the base, with a few appressed hairs near the apex, $\frac{1}{2}$–3 ft. high, usually geniculate at the nodes, with diverging branches. Leaves pinnate or bipinnate, with stalked lanceolate pinnatifid acute segments, on dilated petioles clasping at base; pinnæ spreading, appressedly pilose. Umbels stalked and terminal at the end of the stem and branches, erect, usually of 3 primary, each with about 5 secondary rays. Involucre 0 or rarely with 1 leaflike bract; involucels of several lanceolate-linear acute pilose bracteoles, shorter than the secondary rays. Flowers radiant, white; calyx-lobes obsolete; polygamous, small. Stylopods shortly convex; styles rather short. Fruit ovoid, covered with long patent spines, hooked at the end and shorter than the thickness of the ripe fruit, $\frac{1}{5}$ in. long, with vague lines of appressed smaller bristles corresponding to the primary ridges. Primary fruiting rays about $\frac{1}{2}$ in. long, secondary about $\frac{1}{10}$ in. long. Carpophore entire, $\frac{1}{7}$ in. long. Seeds widely sulcate.—*Scandix infesta*, Linn.; *Caucalis africana*, Thunb. Prod. 49; *Torilis africana*, Spreng. in Schult. Syst. vi. 486.

Nile Land. Abyssinia, *Schimper! Plowden! Petit!* 6000–10,000 ft. alt.

Occurs also in Europe, temperate Asia, and N. and S. Africa; introduced into Australia.

Differs only from the European specimens in the shorter spines in proportion to the diameter of the fruit.

Tigre name, *Dannak-Anschoa.*

2. **C. melanantha,** *Benth. et Hook. f. Gen. Plant.* i. 929. $\frac{1}{4}$–6ft. high, root fusiform annual. Stem either short with several prostrate or ascending branches, or lengthened and branched, subangular, pilose especially towards the top, sometimes subglabrescent at base, geniculaul. Leaves oblong or ovate, the lower ones on long or manifest petioles, much dilated into long-veined and membranous sheaths, amplexicaul at least at base, 1–6 in. long, bipinnate or the upper ones simply pinnate; segments oblong or oval, pinnatifid or lobed at the base, incise, dentate, or dissected into linear lobes, hispid especially on the stalks, veins, and margins. Umbels subcapitate, $\frac{1}{4}$–$\frac{1}{2}$ in. high, on very long more or less pilose, axillary peduncles, hispido-pilose. Primary and secondary fruiting rays $\frac{1}{10}$–$\frac{1}{6}$ in. long. Involucre and involucels of several linear-lanceolate piloso-ciliate leaves, rather exceeding the rays. Calyx-lobes prominent, lanceolate, acute. Petals subentire, of a dark purple colour; disk flat. Fruit somewhat compressed laterally, yellowish-green, with paler bristles, $\frac{1}{6}$ in. long; primary ridges 5, not prominent, clothed with small bristles in 2 or 3 rows and directed upwards; secondary ridges 4, more prominent, armed with longer bristles in one row, directed outwards and downwards, and glochidiate. Carpo-

phore 0. Section of seeds suborbicular, with a deep furrow reaching nearly to the centre.—*Daucus melananthos*, Steud. in Hb. Schimp. Abyss. sec. ii. n. 1145; *Agrocharis melanantha*, Hochst. in Flora 1844, 19; *Agrocharis gracilis*, Hook. f. in Journ. Linn. Soc. vi. 9.

Upper Guinea. Fernando Po, alt. 7000 ft.; fl. December, *Mann!* Cameroons mountains, 7000–8000 ft. alt.; fl. December, fr. January, *Mann!*

Nile Land. Abyssinia, *Schimper!* fl. in June, *Roth! Schimper*, 9300 ft. alt.; fl. and fr. October.

Order LXIX. ARALIACEÆ. (By Mr. W. P. Hiern.)

Tube of the calyx adnate to the ovary, with a short sinuous or obscurely dentate margin. Petals usually 5, valvular, inserted on the interior of the calyx at the base of the free margin. Stamens usually 5, alternate with the petals and inserted along the same line; filaments more or less slender, inflexed at the apex at least in bud; anthers ovate or oblong, affixed on the back to the filament, 2-celled, dehiscing longitudinally. Epigynous disk convex or conical; ovary inferior, 2- or many-celled; each cell having 1 pendulous anatropous ovule. Styles as many as the cells in the ovary (or solitary and lobed), erect or at length recurved. Fruit drupaceous or dry, globose or ovoid, terete or angular when dry, with as many cells and seeds as the ovary, not separating and without a carpophore. Seeds solitary in the cells and pendulous; albumen sulcate, ruminated or smooth, copious; embryo small next the hile; radicle superior. Trees or tall shrubs, glabrous or covered with stellate pubescence or tomentum. Leaves alternate compound or deeply lobed, usually coriaceous and on long petioles which clasp the branch at their base; stipules within and partly adnate to the petioles. Inflorescence terminal or subterminal. Flowers hermaphrodite or polygamous, spicate or racemose, with bracts and bracteoles. Differs as to tropical African species from Umbelliferæ, which are usually herbaceous, either by the inflorescence not being umbelled or by a drupaceous fruit not separating and without a carpophore.

A family of moderate size, chiefly found in the Tropics, though a few species occur in temperate latitudes.

Leaves pinnate. Flowers jointed to the pedicels, panicled. Albumen not ruminated. Ovary 2-celled	1. Panax.
Leaves digitate or palmatipartite. Flowers continuous with the pedicels.	
Flowers umbelled or capitulate. Albumen sulcate, ovary and fruit 5 or many-celled	2. Heptapleurum.
Flowers spicate or racemose. Albumen ruminated, ovary and fruit 2-celled	3. Cussonia.

1. PANAX, Linn.; Benth. et Hook. f. Gen. Plant. i. 938.

Tube of the calyx slightly exceeding the ovary with an entire undulating margin or shortly toothed. Petals 5, broad at the base, valvular, caducous. Stamens 5, with shortly oblong anthers. Styles 2,

short, erect in flower, spreading in fruit, free from the base; epigynous disk more or less conical; ovary 2-celled. Fruit 2-celled drupaceous. Albumen sulcate, not ruminated. Trees with impari-pinnately compound leaves; leaflets entire, opposite, sessile or subsessile. Inflorescence panicled; bracts and bracteoles caducous; pedicels jointed at the apex to the polygamous flowers.

A considerable genus, inhabiting also Tropical and Eastern Asia, New Zealand, Australia, and the islands in the Pacific Ocean.

Leaflets glabrous, cordate at base, thinly coriaceous.
Leaflets tomentose beneath . . . . . 1. *P. pinnatum.*
Leaflets cordate at the base, coriaceous . . . . . 2. *P. ferrugineum.*
Leaflets not cordate at the base, thinly coriaceous . . . . . 3. *P. fulvum.*

1. **P. pinnatum,** *A. Rich. in Fl. Abyss.* i. 335. A small tree with glabrous leaves, crowded at the ends of the branches, 16 in. long, with terete subsulcate petioles, nearly a foot long. Branchlets herbaceous, thick, marked by the scars of fallen leaves, floccoso-tomentose. Leaflets 11–19, oblong, acute, cordate at the base, glaucescent, 3–5 in. long, the lower ones the longer. Umbellules many, arranged in racemes 6–8 in. long, which are placed near together in a terminal inflorescence, the main axis especially of which is covered with a farinose pale yellowish tomentum. Bracteoles tomentose, stalks of the umbellules $\frac{1}{7}$–$\frac{1}{5}$ in. long; rays $\frac{1}{10}$ in. long, ovary striate, glabrous; disk conical, surmounted by 2 short styles. Young fruit $\frac{1}{7}$ in. long.—*Aralia pinnata*, Hochst. in Hb. Schimp. Abyss. n. 1583. *A. farinosa*, Delil. in Ferr. & Gal., Voy. Abyss. iii. 135, n. 72, *teste Seemann.* *Nothopanax farinosum*, Seem. in Rev. Heder. 72.

Nile Land. Abyssinia, fl. April, *Schimper! Ferret and Galinier.*

2. **P. ferrugineum,** *Hiern.* Tree 20 feet high, covered at the extremities and on underside of leaflets with stellate tomentum. Leaves pinnate, obovate-oblong, with terete midrib, 4 ft. long; leaflets 15, ovate or ovate-oblong, acuminate, much cordate at the base, subsessile, 2–5$\frac{1}{2}$ in. long, coriaceous, shagreened above with depressed net-veins, covered with ferruginous tomentum beneath, pinnately veined. Inflorescence 15 in. long or more; racemes of the inflorescence ranging up to 4$\frac{1}{4}$ in. long; flowers subsessile, glabrous, 1–3 together. Fruit broadly ovate, glabrous, slightly emarginate at base, contracted along middle line, $\frac{1}{6}$–$\frac{1}{5}$ in. long and wide.

Nile Land. Abyssinia, Ankober, *Dr. Roth!*
Abyssinian name, *Gingiro Wombir.*

3. **P. fulvum,** *Hiern.* Tree 30–40 ft. high, covered at the extremities and on underside of leaflets with fulvous stellate tomentum. Leaves pinnate, oblong, with terete midrib, a foot long or more; petioles 4 in. long, half amplexicaul at base; leaflets 9, ovate-oblong, suddenly acuminate, wide at the base but not cordate, shortly stalked, 3–6 in. long, stalks $\frac{1}{8}$–$\frac{1}{6}$ in. long, thinly coriaceous, dark green above. Inflorescence 15 in. long; racemes of inflorescence ranging up to 1$\frac{2}{3}$ in.

long. Flowers subsessile, glabrous; pedicels $\frac{1}{14}$ in. long, crowded. Calyx and corolla brown. Fruit ? not mature on the specimens. Petals calyptrate.

Upper Guinea. Fernando Po, 1300 ft. alt., *Mann!*

2. **HEPTAPLEURUM**, Gærtn.; Benth. et Hook. f. Gen. Plant. i. 942.

Margin of the calyx annular with obsolete teeth. Petals 5 or 6, valvular. Stamens 5 or 6; anthers ovate or oblong. Epigynous disk convex, in male flowers concave; styles usually 5 or 6, either free or united at base into a column, or obsolete. Ovary 5- or more-celled; cells 1-ovuled. Fruit drupaceous, ovoid or subglobose, 5- or 6-lobed in the dried state, 5- or 6-celled; cells 1-seeded. Seeds laterally compressed; albumen not ruminated.—Tall shrubs or trees. Leaves compound, digitate, on long petioles, crowded near the ends of the branches; petioles long, dilated and clasping at the base; stipules adnate inside the petioles. Umbelluled racemes crowded in axils of leaves at ends of branches; pedicels continuous with the flowers; bracts membranous, caducous.—*Astropanax*, Seem. in Journ. Bot. 1865, 176; *Sciadopanax*, Seem. in Rev. Heder. 49.

A rather large genus, found also in Tropical Asia and in Australia, &c.

Leaflets more or less serrate; cordate at the base.
- Styles distinct from the base. Petioles not 6 in. long . . . 1. *H. abyssinicum.*
- Style lobed at the apex. Petioles nearly 12 in. long . . . . 2. *H. elatum.*

Leaflets entire, not or scarcely cordate at the base.
- Styles radiating in fruit and raised on a column about as long as themselves. Flowers pedicelled.
  - Small tree. Umbellules 8–12-flowered on pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long 3. *H. Barteri.*
  - Tree. Umbellules 4–5-flowered, on pedicels about $\frac{1}{4}$ in. long 4. *H. Baikiei.*
  - Climbing shrub. Umbellules about 10-flowered, on shorter pedicels . . . . . 5. *H. scandens.*
- Stigmas scarcely raised above the wide convex disk. Flower capitulate . . . . . 6. *H. Mannii.*

1. **H. abyssinicum,** *Benth. et Hook. f. Gen. Plant.* i. 942. Glabrous. Branches woody, $\frac{1}{3}$–$\frac{1}{2}$ in. thick close to the extremities, covered with an irregular angular bark, transversely seamed. Petioles 4–5 in. long, crowded near the ends of the branches, faintly sulcate, terete; stalks of the leaflets 1–2 in. long; leaflets 7, 2–4 in. long, oval-ovate, rounded at the base, much acuminate or caudate at the apex, crenate-serrate, thinly coriaceous. Inflorescence 4–9 in. long; primary pedicels $\frac{1}{2}$–$1\frac{2}{3}$ in. long, patent; secondary $\frac{1}{10}$–$\frac{1}{3}$ in. long. Petals calyptrate. Flowers polygamous. Bracts pubescent; bracteoles lanceolate. Styles 3 and short in male flower, 5 or 6 in female flower, recurved in fruit, distinct from the base. Fruit $\frac{1}{4}$–$\frac{1}{3}$ in. long.—*Aralia abyssinica*, Hochst. in A. Rich. Fl. Abyss. i. 336. *Sciodaphyllum abyssinicum*, Steud. Nomencl. Bot. ii. 537, Miq. Ann. Lugd. Bat. i. 26. *Astropanax abyssinicum*, Seem. Journ. Bot. 1865, 177.

Nile Land. Abyssinia, *Schimper!*

2. **H. elatum,** *Hiern.* Tree 50–60 ft. high; quite glabrous except the bracts and bracteoles. Branches $\frac{1}{3}$–$\frac{1}{2}$ in. thick close to the extremities. Leaves with 6 leaflets; petioles sulcate, $10\frac{3}{4}$ in. long; leaflets ovate or ovate-oblong, serrulate, nearly cordate at base, acuminate at apex, shining, 6–8 in. long, thinly coriaceous, on stalks 2–3 in. long. Inflorescence terminal, 6–8 in. long; primary pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. long, secondary 5–7 together, $\frac{1}{8}$–$\frac{1}{5}$ in. long; bracteoles lanceolate, fulvo-pubescent. Calyx campanulate or turbinate. Petals and stamens 5. Style conical, 4–5-lobed at the apex.—*Paratropia elata,* Hook. f. in Journ. Linn. Soc. vii. 196. *Astropanax elatum.* Seem. in Journ. Bot. 1865, 177. *Sciodaphyllum elatum,* Seem. in Rev. Heder. 51.

Upper Guinea. Camaroons mountains, 7500 ft. alt., fl. in February, *Mann!*

3. **H. Barteri,** *Hiern.* A small glabrous tree. Branches about $\frac{1}{2}$ in. thick near the extremities. Leaves with 5 leaflets; petioles faintly sulcate, $5\frac{1}{2}$–$5\frac{3}{4}$ in. long; leaflets 4–6 in. long, oblong, sharply acuminate, coriaceous, rounded at the base, on stalks $\frac{1}{2}$–$1\frac{1}{2}$ in. long, entire, shining. Bracteoles ovate-lanceolate, glabrescent; inflorescence $7\frac{3}{4}$–8 in. long; umbellules 8–10-flowered; primary pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long, secondary $\frac{1}{5}$–$\frac{1}{4}$ in. long. Styles radiating in fruit and raised on a column about as long as themselves. Fruit subglobose, $\frac{1}{10}$ in. long, about 8-ribbed, rather flat at the apex, with persistent remains of styles.—*Astropanax Barteri,* Seem. in Journ. Bot. 1865, 177. *Sciodaphyllum Barteri,* Seem. in Rev. Heder. 51.

Upper Guinea. Niger; Sugar Loaf Mountain, Sierra Leone, fr. in May, *Barter!* Prince's Island, *Barter!*

4. **H. Baikiei,** *Hiern.* A glabrous tree, 20 ft. high. Leaves of 3 or more leaflets; petioles somewhat sulcate, 11 in. long; leaflets oval-oblong, shortly acuminate at apex, cuneate at base, very thinly coriaceous, entire, $8\frac{1}{2}$ in. long, on stalks nearly 2 in. long. Inflorescence terminal, $4\frac{1}{2}$–$5\frac{1}{2}$ in. long; umbellules 4 or 5-flowered; primary pedicels $\frac{1}{5}$–$\frac{3}{10}$ in. long; secondary $\frac{1}{7}$–$\frac{1}{4}$ in. long; bracteoles lanceolate. Styles radiating in fruit, raised on a column about as long as themselves; fruit $\frac{1}{6}$ in. long, subglobose, acutely 5–7-ribbed, white when ripe.—*Astropanax Baikiei,* Seem. in Journ. Bot. 1865, 177. *Sciodaphyllum Baikiei,* Seem. in Rev. Heder. 51.

Upper Guinea. Niger, *Barter!*

5. **H. scandens,** *Hiern.* A climbing shrub, 20–30 feet high. Leaves 5–7-foliate; petioles $4\frac{1}{2}$–6 in. long, striate, terete; leaflets $3\frac{1}{2}$–$7\frac{1}{2}$ in. long, oval-oblong, acuminate or subcaudate at apex, rounded or subcordate at base, shining especially above, thinly coriaceous, entire, on stalks 1–$1\frac{1}{2}$ in. long. Inflorescence terminal, about 5 in. long, with ovate brown-farinose bracteoles arranged in a spiral of $\frac{8}{24}$ in. in bud; umbellules about 10-flowered; primary pedicels $\frac{1}{8}$ to $\frac{1}{6}$ in. long, about twice as long as the secondary. Styles 5 or 6, diverging or radiating

in fruit raised on a short column of about their own length; stigmas subcapitate; fruit subglobose, acutely 5- or 6-ribbed, $\frac{1}{8}$ in. long.

Upper Guinea. Camaroons mountains, *Mann!* fr. February, 4500 ft. alt.

6. **H. Mannii,** *Benth. et Hook. f. Gen. Plant.* i. 942. A quite glabrous tree, 40–50 ft. high. Branches $\frac{1}{2}$–$\frac{3}{4}$ in. thick close to the extremities. Leaves 3–10-foliate; petioles 6–11 in. long, terete, faintly sulcate; leaflets oval-oblong, acuminate at apex, somewhat cuneate or scarcely rounded at base, thinly coriaceous, 4–8 in. long, shining above, entire, on stalks 1–$2\frac{1}{2}$ in. long. Inflorescence 7–17 in. long, terminal; primary pedicels $\frac{1}{3}$–$\frac{3}{4}$ in. long; secondary obsolete; bracteoles ovate acuminate. Capitula of about 20 flowers, $\frac{1}{4}$ in. in diameter. Calyx and corolla green. Stigmas papilliform, scarcely raised above the wide convex disk. Fruit subglobose, 1-10th in. long, 5- or 6-ribbed.—*Paratropia Mannii,* Hook. f. in Journ. Linn. Soc. vi. 10. *Astropanax Manni,* Seem. in Journ. Bot. 1865, 178. *Sciodaphyllum Manni,* Seem. in Rev. Heder. 51.

Upper Guinea. Fernando Po and Camaroons mountains, 4500–7500 ft. alt., *Mann!*

3. CUSSONIA, Thunb.; Benth. et Hook. f. Gen. Plant. i. 944.

Calyx with sinuous or obscurely 5-dentate margin; petals 5, valvate; stamens 5; anthers ovate. Epigynous disk flattish or shortly conical; ovary 2-celled; styles 2, short. Fruit 2-celled, fleshy or dry; albumen ruminated.—Glabrous subglabrous or softly terete trees with palmatifid or digitate leaves, with crenate or entire leaflets crowded near the ends of the branches. Stipules lanceolate, partly connate within the petiole. Flowers spicate or racemose, hermaphrodite, bracteate, sessile or continuous with the pedicels.—*Sphærodendron,* Seem.; Benth. et Hook. f. Gen. Plant. i. 1009.

Genus of about 12 species, limited to Tropical and Southern Africa and the neighbouring islands.

Flowers spicate, sessile.
- Leaves palmatipartite . . . . . 1. *C. arborea.*
- Leaves digitate.
  - Leaflets and spikes sessile or subsessile.
    - Leaflets crenately serrulate; petioles $5\frac{1}{4}$–$7\frac{1}{2}$ in. long . . . 2. *C. Kirkii.*
    - Leaflets entire; petioles 15 in. long . . . . . 3. *C. Barteri.*
  - Leaflets lobed and clavate spikes, both stalked . . . . . 4. *C. spicata.*

Flowers pedicelled . . . . . 5. *C. angolensis.*

1. **C. arborea,** *Hochst. in A. Rich. Fl. Abyss.* i. 336, *t.* 56. A softly tomentose tree, with branches thick at the extremities, marked with the scars of the fallen leaves. Petioles subsulcate, terete, 6–18 in. long; leaves palmate, with 5–7 lobes divided to $\frac{1}{8}$–1 in. from petiole, $\frac{1}{2}$–$\frac{3}{4}$ ft. long; lobes oval, narrowed towards base, acutely acuminate at apex, dark green above, paler beneath, serrulate. Inflorescence about a foot long, consisting of spikes crowded at ends of branches; bracteoles lanceolate, shorter than the fruit. Flowers sessile, crowded, spirally arranged on the spikes, polygamous. Rachis $\frac{1}{8}$–$\frac{1}{4}$ in. thick.

Fruit ovate-urceolate, glabrescent, fleshy, $\frac{1}{4}$ in. long; margin of calyx sinuoso-5-dentate, wider than the neck of the fruit; epigynous disk conical, continuous with style which is bilobed at the apex.

Nile Land. Abyssinia, *Schimper!*

2. **C. Kirkii,** *Seem. in Rev. Heder.* 75. A tree about 28 ft. high, not quite glabrous. Leaves digitate, 7–9-foliate. Petioles $5\frac{1}{4}$–$7\frac{1}{2}$ in. long, somewhat sulcate, terete; leaflets narrowly oval-lanceolate, acuminate or cordate at apex, cuneate to a sessile base, crenately serrulate, $3\frac{1}{2}$–$6\frac{1}{2}$ in. long. Spikes 8 in. long, slender, numerous from among the leaves; axis of spike densely covered with small flowers near the top, less dense downwards, and absent from the base, scattered with small branched hairs; bracteoles minute. Flowers globular, small, sessile along a considerable surface. "The stem yields gum when cut."

Mozamb. Distr. Moramballa, 100–3000 ft. alt., *Dr. Kirk!*

A glabrous digitate leaf with 8 leaflets from Zanzibar, also sent by Dr. Kirk! seems to belong to an allied species; the petiole is 21 in. long, leaflets 5–6 in. long by $2\frac{1}{2}$–3 in. wide, thinly coriaceous, oval-oblong, narrowed at base, suddenly acuminate at apex, margins serrulate.

3. **C. Barteri,** *Seem. in Rev. Heder.* 75. A small tree, glabrous except the inflorescence, with the ends of the branches very thick. Leaves digitate of 6 oblong-obovate leaflets cuneate at the base, narrowly and acutely acuminate or caudate at the apex, entire, minutely reticulate, 7–$8\frac{1}{2}$ in. long. Petioles terete-sulcate, 15 in. long, pithy. Spikes about $6\frac{1}{2}$ in. long, with numerous sessile flowers spirally arranged. Rachis $\frac{1}{7}$–$\frac{1}{6}$ in. thick, pubescent; bracteoles ovate-lanceolate, glabrescent. Fruit subglobose, $\frac{1}{5}$–$\frac{1}{4}$ in. long, glabrate, white; calyx with sinuous margin; epigynous disk shortly conical, continuous with style, which is bilobed at the spreading apex.

Upper Guinea. Niger, *Barter!*

Dry rocky hills.

4. **C. spicata,** *Thunb., DC. Prod.* iv. 255. A glabrous tree with soft stems, 18 feet high. Leaves digitate, 5–9-foliate; petioles about 6 in. long; leaflets stalked, 3–5 in. long, simple or trifid with serrately notched oblanceolate lobes, coriaceous, glabrous, pale green. Spikes terminal and subterminal, clavate, about 3 in. long by nearly 1 in. thick, on peduncles 4–8 in. long, thick, tapering. Flowers sessile, dense, spirally arranged on the rachis; bracteoles broad, shorter than the flowers. Styles 2, recurved. Fruit $\frac{1}{3}$ in. long.

Mozamb. Distr. Tshiradzura, 4500 ft. alt., *Dr. Kirk!*

The specimen consists only of a terminal piece of a branch in imperfect fruit without leaves or flowers. The above description is taken partly from Cape specimens.

5. **C. angolensis,** *Hiern.* A tree, 15–30 ft. high, the trunk of the bigger ones 2 ft. or more in diameter, erect, tapering, bare for $\frac{2}{3}$ of the height, terminated by a globular head of branches; wood white, strong, durable, and useful for many purposes. Branches more than an inch thick at the extremities below the inflorescence. Petioles

9½–20½ in. long, terete, striate. Leaves digitate, with 6–9 leaflets; ovate, broad near the base, but narrowed at the very base, much acuminate or subcaudate at the apex, thinly coriaceous, serrate, about 5 in. long, on stalks 1½ to 3 in. long, which bear at or near the top glands or even teeth, and which in places tend to be winged. Stipules linear-lanceolate, 1¼ in. long. Inflorescence consisting of several erect racemes crowded at the ends of the branches; bracteoles deltoid-acuminate, pubescent; rachis spongy, pubescent, with tawny setose hairs. Flowers on pedicels $\frac{1}{10}$–$\frac{1}{5}$ in. long, rather crowded, green. Margin of the calyx sinuoso-5-dentate. Petals deltoid-lanceolate; filaments not exceeding the petals. Epigynous disk rather shortly conical, with several longitudinal ridges in fruit, continuous with the short column of the bifid styles, which are recurved in fruit. Fruit dry, ovoid, ¼ in. long.—*Sphærodendron angolense*, Seem. in Journ. Bot. 1865, p. 34, t. 26, et Rev. Heder. 37, t. 1.

Lower Guinea. Angola, Pungo Andongo, 2400–3800 ft. alt., fl. Dec., fr. March; Huilla, 3800–5500 ft. alt.; Ambaca, fr. October, *Dr. Welwitsch!*

Order LXX. **RUBIACEÆ.** (By W. P. Hiern.)

Flowers usually hermaphrodite, regular and symmetrical, rarely irregular or unsymmetrical, sometimes dimorphic. Calyx-tube adnate to the ovary; limb various. Corolla inserted on the ovary, various in form and æstivation. Stamens usually isomerous with the corolla-lobes, inserted at the mouth or throat or on the tube of the corolla; filaments various; anthers usually oblong or linear, 2-celled, dehiscing by lateral slits towards the face, rarely connivent and dehiscing by apical pores; attached at the back or base. Disk at the top of the ovary, between the insertion of the corolla and that of the style, usually annular or cushion-shaped, sometimes inconspicuous or lobed. Ovary 1-12-celled, usually 2-celled; style solitary, entire toothed cleft or partite; stigma terminal, various in form, entire or lobed; placentas on the septum or at one of the extremities of the cells. Ovules solitary or indefinite or a few in each cell, variously attached to or impressed on the placentas. Fruit various. Seeds albuminous; albumen copious or scanty, uniform or occasionally ruminated; embryo straight or curved.

Shrubs or trees, or in some genera herbs, occasionally scandent; rarely spinous. Leaves opposite or verticillate, simple, quite entire (or rarely repand-dentate); stipules inter- or intra-petiolar, various in shape, persistent or deciduous, entire, cut or lobed, free or connate or adnate to the leaf-base or petiole, absent (or foliaceous) in the tribe *Galieæ*. Inflorescence various, bracteate or ebracteate; flowers usually tetramerous or pentamerous, but sometimes even decamerous; rarely the calyx is spathaceous or the corolla only trimerous.

One of the largest Natural Orders, chiefly tropical and subtropical, and most richly represented in America. About 30 genera are endemic to this Flora, and 3 are here described for the first time.

A. Ovules indefinite; rarely few, 2 or more.

1. Fruit dry, capsular or 2-coccous or rarely dehiscing irregularly at the apex, or fruits confluent into a fleshy syncarpium.

Flowers arranged in compact or confluent globular heads — I. NAUCLEÆ.
Flowers solitary or not in compact nor confluent globular heads.
Seeds winged / Trees or shrubs . . . . . II. CINCHONEÆ.
Seeds not winged / Herbs or shrubs usually small . . . . . III. HEDYOTIDEÆ.

2. Fruit baccate, indehiscent (except *Mussænda luteola*, Del.); fruits not confluent into a syncarpium.

Corolla valvate in æstivation . . . . . IV. MUSSÆNDEÆ.
Corolla imbricated or contorted in æstivation.
Seeds numerous, small, angular. Corolla-lobes imbricated or contorted in æstivation . . . . . V. HAMELIEÆ.
Seeds rounded or if angular then not numerous and small. Corolla-lobes contorted in æstivation . . VI. GARDENIEÆ.

B. Ovules solitary.

1. Radicle of the embryo superior.

Corolla imbricate in æstivation . . . . . VII. GUETTARDEÆ.
Corolla contorted in æstivation . . . . . VIII. ALBERTEÆ.
Corolla valvate in æstivation . . . . . IX. VANGUERIEÆ.

2. Radicle of the embryo inferior.

Corolla contorted in æstivation . . . . . X. IXOREÆ.
Corolla valvate in æstivation.
Leaves stipulate; stipules unlike the leaves.
Flowers capitate, calyx-tubes confluent . . . . XI. MORINDEÆ.
Calyx-tubes not confluent, separate.
Ovules basilar erect anatropous.
Flowers hermaphrodite.
Fruit indehiscent . . . . . XII. PSYCHOTRIEÆ.
Fruit dicoccous . . . . . XIII. PÆDERIEÆ.
Flowers unisexual . . . . . XIV. ANTHOSPERMEÆ.
Ovules attached to the septum, amphitropous . XV. SPERMACOCEÆ.
Leaves exstipulate, verticillate (or the stipules foliaceous, like the leaves) . . . . . XVI. GALIEÆ.

I. NAUCLEEÆ.

Calyx-tubes confluent. Fruits forming a syncarpium.
Corolla imbricate in æstivation . . . . . 1. SARCOCEPHALUS.
Calyx-tubes contiguous or slightly cohering, not confluent.
Fruits capsular not forming a syncarpium. Corolla valvate in æstivation.
Bracteoles between the flowers paleaceous. Branches without spines.
Calyx-limb half cleft . . . . . 2. ADINA.
Calyx-limb truncate or obscurely toothed . . . . 3. MITRAGYNE.
Bracteoles wanting. Branches spinous . . . . . 4. UNCARIA.

II. CINCHONEÆ.

Corolla valvate in æstivation, funnel-shaped.
Cymes spicate. Corolla-limb not appendaged . . . . 5. HYMENODICTYON.
Cymes corymbose. Corolla-limb appendaged . . . . 6. CORYNANTHE.
Corolla contorted in æstivation, salver-shaped . . . . 7. CROSSOPTERYX.

III. HEDYOTIDEÆ.

Anthers connivent, dehiscing by apical pores. Fruit bursting irregularly at the apex . . . . . 8. ARGOSTEMMA.

Anthers not connivent, dehiscing laterally. Fruit usually dehiscing regularly, rarely indehiscent.
Calyx-lobes unequal or limb oblique.
Capsule loculicidal.
Corolla-throat bearded. Capsule-valves persistent — 9. PENTAS.
Corolla-throat glabrous. One valve of the capsule deciduous . . . . . 10. VIRECTA.
Fruit dicoccous.
Inflorescence spicate. Calyx-limb not obliquely dilated, but one lobe elongated . . . . . 11. OTOMERIA.
Inflorescence corymbose. Calyx-limb obliquely dilated . . . . . 12. DIRICHLETIA.
Calyx-lobes equal or nearly so.
Style filiform, sub-entire or with short linear branches.
Seeds numerous. Stipules ovate or truncate, usually setose or bicuspidate . . . . . 13. OLDENLANDIA.
Style branches spathulate. Seeds few. Stipules lanceolate, not truncate . . . . . 14. HEKISTOCARPA.

IV. MUSSÆNDEÆ.

Inflorescence terminal . . . . . 15. MUSSÆNDA.
Inflorescence axillary, rarely axillary and terminal.
Inflorescence not enclosed in bracts.
Ovary 2-celled. Flowers minute . . . . . 16. PAURIDIANTHA.
Ovary 3–5-celled (rarely 2-celled in doubtful species of *Sabicea*). Flowers not minute.
Calyx-teeth minute or small . . . . . 17. UROPHYLLUM.
Calyx-lobes not small, nor petiolate . . . . . 18. SABICEA.
Calyx-segments some or all soon foliaceous and petiolate.
Stipules multified. Calyx-segments more or less unequal . . . . . 19. TEMNOPTERYX.
Stipules entire or cleft. Calyx-segments more or less equal . . . . . 20. PENTALONCHA.
Inflorescence enclosed in one or two campanulate or connate bracts . . . . . 21. STIPULARIA.

V. HAMELIEÆ.

Corolla imbricated in the bud. Stipules small, subulate, two together (except *Heinsia benguelensis*). Flowers rather large. Inflorescence not elongated . . . . . 22. HEINSIA.
Corolla contorted in the bud (or in *Bertiera breviflora* sometimes imbricated). Stipules lanceolate or oblong, not small, solitary between each leaf, often connate at the base. Flowers rather small. Inflorescence elongated or with elongated branches . . . . . 23. BERTIERA.

VI. GARDENIEÆ.

Inflorescence terminal or terminating short lateral branches.
Ovary completely 2-celled.
Calyx lobes contorted in the same direction as the corolla-lobes in the bud. Style branched above.
Anther cells divided into small compartments by longitudinal and numerous transverse septa . . 24. DICTYANDRA.
Anthers not ∞-locellate . . . . . 25. LEPTACTINA.

Calyx open in æstivation. Style clavate or fusiform above.
Flowers corymbose, many together.
Ovules impressed on the large fleshy placentas.
Albumen uniform . . . . . 26. TARENNA.
Ovules collateral; placentas inconspicuous. Albumen ruminated . . . . . 27. ENTEROSPERMUM.
Flowers solitary or few together . . . . . 28. RANDIA (§ *Ceriscus* and § *Euclinia*.)

Ovary 1-celled.
Stigma club-shaped, included or not much exserted . 29. GARDENIA.
Stigma capitate, much exserted . . . . . 30. MACROSPHYRA.
Inflorescence axillary.
Style club-shaped or fusiform, undivided or bidentate.
Ovules numerous.
Calyx-lobes open in æstivation.
Calyx-limb truncate or dentate or cleft. Fruit rounded or narrowed at the base.
Corolla-tube not very slender. Testa membranous . . . . . 28. RANDIA (§ *Gynopachys*).
Corolla-tube very slender. Testa fibrous . . 31. OXYANTHUS.
Calyx-limb deeply lobed. Fruit attenuate at the base . . . . . 32. MITRIOSTIGMA.
Calyx-lobes contorted in æstivation . . . . . 33. AMARALIA.
Ovules 2–4 together, impressed on the large fleshy placentas. Ovary 4-celled . . . . . 34. MORELIA.
Ovules 2–3 together, collateral, pendulous; placentas small. Ovary 2-celled . . . . . 35. ZYGOON.
Style with 2 branches.
Albumen ruminated; aril small . . . . . 36. GALINIERA.
Albumen uniform; aril 0.
Anthers sessile or very nearly so.
Ovules 2 together, impressed on the fleshy placentas . . . . . 37. EMPOGONA.
Ovules 2–4 together, not impressed on the placentas. Testa thin. Flowers precocious . 38. FERETIA.
Ovules numerous. Testa fibrous, sulcate . . . 39. POUCHETIA.
Anthers furnished with filaments of moderate length . . . . . 40. TRICALYSIA.
VII. GUETTARDEÆ . . . . . 41. GUETTARDA.

VIII. ALBERTEÆ.

Corolla funnel shaped or salver-shaped. Flowers sessile or sub-sessile in dense axillary clusters (or solitary and terminal).
Calyx short; limb cleft dentate or truncate, not sulcate.
Corolla funnel-shaped; throat more or less hairy. Style undivided.
Calyx 5–6-cleft. Stamens exserted. Albumen not ruminated. Bracteoles lanceolate or subulate . 42. CREMOSPORA.
Calyx 4-toothed or truncate. Stamens included. Albumen ruminated. Bracteoles cup-shaped . . 43. POLYSPHÆRIA.
Corolla salver-shaped; throat glabrous. Style branched . . . . . 44. BELONOPHORA.
Calyx oblong, not short; limb sulcate, 5-cleft . . . . 45. AULACOCALYX.
Corolla funnel-shaped. Flowers in dense subterminal pedunculate corymbs . . . . . 46. LAMPROTHAMNUS.
Corolla subrotate. Flowers pedicellate, in lax axillary panicles . . . . . 47. RHABDOSTIGMA.

IX. Vanguerieæ.

Herbs. Calyx-limb unequally 5–4-partite . . . . . 48. Pentanisia.
Shrubs or trees. Calyx truncate or equally lobed.
  Stigma capitate, globose, mitriform, or calyptriform.
    Corolla-lobes glabrous inside.
      Calyx-limb truncate, dentate or shortly lobed; lobes not foliaceous. Leaves opposite.
        Ovary 2-celled . . . . . 49. Canthium.
        Ovary 5–3-celled . . . . . 50. Vangueria.
    Calyx-limb various. Leaves verticillate . . . . . 51. Fadogia.
    Calyx-lobes sub-foliaceous, persistent. Leaves opposite.
      Corolla-tube short, straight . . . . . 52. Cuviera.
      Corolla-tube rather elongated, arching . . . . . 53. Ancylanthos.
  Stigma subclavate or fusiform and divided into two linear branches. Corolla lobes hairy inside near the base . . . . . 54. Craterispermum.

X. Ixoreæ.

Ovules peltately attached about the middle of the septum of the ovary. Albumen of the seeds uniform. Seeds convex on the back, plane-concave or excavated on the face.
  Calyx-lobes not accrescent. Style usually exserted.
    Bracteoles not connate at or near the base of the calyx. Flowers usually 4-merous and terminal. Seeds concave on the face.
      Calyx-limb shortly dentate or truncate. Style shortly exserted, usually with 2 branches . . 55. Ixora.
      Calyx-limb various. Style far exserted, entire or bidentate . . . . . 56. Pavetta.
    Bracteoles connate at or near the base of the calyx into a single or double calyculus. Flowers usually 5–7-merous and axillary. Seeds marked with a longitudinal furrow down the face . . . . . 57. Coffea.
  Calyx-lobes accrescent. Style included . . . . . 58. Psilanthus.
Ovules inserted on the small fleshy placentas ascending from the base of the ovary. Albumen of the seeds deeply ruminated. Seed globose . . . . . 59. Rutidea.
XI. Morindeæ . . . . . 60. Morinda.

XII. Psychotrieæ.

Flowers arranged in terminal, rarely axillary, panicles or in sub-capitate clusters.
  Ovary 2-celled.
    Albumen of the seeds uniform; ovules smooth . . . 61. Psychotria.
    Albumen of the seeds ruminated; ovules somewhat wrinkled . . . . . 62. Grumilea.
  Ovary 5–7-celled . . . . . 63. Trainolepis.
Flowers arranged in heads or rarely solitary, terminal or rarely axillary.
  Heads involucrate or the solitary flowers bracteate at the base.
    Small creeping herbs . . . . . 64. Geophila.
    Small shrubs . . . . . 65. Cephaelis.
  Heads exinvolucrate . . . . . 66. Trichostachys.
Flowers axillary, fasciculate . . . . . 67. Lasianthus.
XIII. Pæderieæ . . . . . 68. Siphomeris.
XIV. Anthospermeæ . . . . . 69. Anthospermum.

XV. SPERMACOCEÆ.

Fruit dicoccous, with indehiscent cocci.	
Flowers usually tetramerous. Herbs; stipules multisetose. Stigma sub-capitate	70. DIODIA.
Flowers pentamerous. Small shrubs; setæ of the stipules about 2 or obsolete. Style with 2 short linear branches	71. GAILLONIA.
Fruit dicoccous with one or both of the cocci dehiscent.	
Ovary 2-celled. Corolla-lobes 4 or fewer.	
Calyx-teeth subulate, lanceolate or linear. Flowers with several paleaceous intervening bracteoles or without bracteoles.	
Fruit dividing into cocci from the top	72. SPERMACOCE.
Fruit dividing into cocci from the bottom . . .	73. HYPODEMATIUM.
Calyx-teeth 8 or 4, round. Flowers immersed in paleaceous bracteoles	74. OCTODON.
Ovary 3-celled. Corolla-lobes usually 5, occasionally 4 .	75. RICHARDIA.
Fruit sub-didymous, bursting transversely across the middle	76. MITRACARPUM.

XVI. GALIEÆ.

Flowers pentamerous	77. RUBIA.
Flowers tetramerous	78. GALIUM.

1. SARCOCEPHALUS, Afzel.; Benth. et Hook. f. Gen. Pl. ii. p. 29.

Flowers crowded on globose common receptacles, forming compact pedunculate globose heads, without intervening bracteoles. Calyx-tubes cohering; teeth 5–6, hairy, jagged at the tip or in some species with as many alternating appendages. Corolla narrowly funnel-shaped, rather fleshy, glabrous, 5-lobed, imbricated in æstivation, caducous. Anthers 5, subsessile, inserted at the mouth of the corolla, ovate-oblong. Disk inconspicuous. Ovary 2-celled; style filiform, exserted, caducous; stigma oblong or fusiform, thicker than the style, glabrous, emarginate or bifid; ovules numerous, anatropous. Syncarpium fleshy. Seeds small, not winged.—Trees or scandent shrubs with subterete or obtusely quadrangular branchlets, opposite (or in *S. Russeggeri* very rarely in whorls of three) subcoriaceous leaves, interpetiolar caducous stipules, and terminal and axillary heads of whitish pale pink or yellowish flowers.

A small genus found also in Tropical Asia, North Australia and Queensland.

In shape and colour the fruit may be compared to a strawberry, though in flavour it resembles an apple; eaten to excess it acts as an emetic. Flowers smell like orange-blossoms. *Schweinfurth*, "Heart of Africa," English edition, i. p. 192.

Calyx-teeth furnished with alternating filiform-clavate appendages	1. *S. esculentus*.
Calycine appendages not developed	2. *S. Russeggeri*.

1. **S. esculentus,** *Afzel. ex Sab. in Trans. Hort. Soc. Lond.* v. 442, t. 18 (1824). A glabrescent or puberulous tree with long branches or often a scandent shrub, 10–25 ft. high or more. Leaves elliptical, shortly acuminate, obtusely narrowed or nearly rounded at the base, with about 7–8 lateral veins on each side, 2–8 by 1–4 in.; petiole

$\frac{1}{5}$–$\frac{4}{5}$ in.; stipules short, obtuse, keeled, minutely ciliate. Flowering heads about 2 in. diam., terminal. Calyx-teeth furnished with alternating filiform-clavate appendages of $\frac{1}{15}$ in. long, which are soon torn up from their attachment by the growth of the white pale pink or yellowish fragrant corolla, the latter $\frac{1}{2}$ in. long. Style brownish pink; stigma snow-white. Fruiting head $2\frac{1}{2}$–$3\frac{1}{2}$ in. diam., of a deep red colour, with brown granulated surface and solid firm edible core, which occupies about a quarter of the diameter.—*Cephalina esculenta*, Schum. and Thonn. Pl. Guin., p. 105, quoted by DC. in Prodr. iv. p. 368, and others as *C. scandens*. *Nauclea latifolia*, Smith! in Rees Cycl. xxiii. n. 5. *N. sambucina*, T. Winterbottom, account of Sierra Leone ii. p. 45 (1803).

The peach or country fig of the natives at Sierra Leone. A specimen of gum from this plant is in the Kew Museum.

Upper Guinea. Sierra Leone, *G. Don!*, *Th. Vogel!*, *Afzelius!*, *Smeathman!*; Senegambia, *Park!*; Monrovia, *Th. Vogel* (Niger Fl. 32): Cape Coast, *Th. Vogel*; Guinea, *Thonning* (flowers in May and June); Bagroo River, *Mann!* (flowers in April); Niger, Nupe, *Barter!* (common, fruit ripe in October).

Common on the coast of the Niger. Native name in the neighbourhood of Bassa 'doy,' and amelliky at Sierra Leone (Winterbottom *l. c.*).

2. **S. Russeggeri,** *Kotschy ex Schweinf. Rel. Kotsch.* p. 49, t. 33 (excl. fig. 6–7, 9–12). A shrub of 6–20 ft. or a tree ranging up to 70 ft., very nearly glabrous, shining. Leaves broadly elliptical or occasionally somewhat oblong, shortly and suddenly acuminate, in most cases abruptly narrowed into the petiole, with 6–7 lateral veins on each side, 3–12 by 2–10 in.; petiole $\frac{1}{2}$–$1\frac{3}{4}$ in.; stipules short, obtuse, keeled, minutely ciliate. Flowering heads 1–$1\frac{1}{4}$ in. diam., axillary and terminal. Calyx-teeth irregularly jagged, without alternating appendages. Corolla white, $\frac{1}{3}$–$\frac{3}{8}$ in. long, sweet-scented. Fruiting head $1\frac{1}{4}$–$2\frac{1}{2}$ in. diam., brown, apple-tasted, edible; pulp reddish pink; seeds red.—*Sarcocephalus*, sp., T. Thoms. in Speke, Journ., App. p. 636 (1863).

North Central. Monbuttu-land, *Schweinfurth!*

Nile Land. Sennaar, *Kotschy!* Woods at Madi, *Speke and Grant!*; Djur-land, *Schweinfurth!* Niamniam-land, *Schweinfurth!*

2. ADINA, Salisb.; Benth. et Hook. f. Gen. Pl. ii. p. 30.

Flowers crowded, compact, on globose common bracteolate receptacles. Calyx-tubes contiguous, prismatic; limb half 5-cleft. Corolla-tube usually elongated; throat funnel-shaped, glabrous; lobes 5, short, ovate or rounded, valvate in the bud. Stamens 5, inserted on the throat of the corolla; filaments short; anthers basifixed, shortly oblong, exserted. Disk cup-shaped. Ovary 2-celled; style filiform, much exserted; stigma capitate; ovules numerous, pendulous, imbricated. Capsule septicidally dicoccous; cocci dehiscing inside. Seeds oblong, winged at both ends.—Trees or shrubs with terete branches, opposite or whorled petiolate leaves, interpetiolar ample oblong obtuse stipules, solitary or panicled pedunculate heads, and small flowers.

A tropical or sub-tropical genus of about 7 species, chiefly Asiatic and American.

1. **A. microcephala,** *Hiern.* A shrub with quite glabrous branches. Leaves lanceolate, whorled in fours, 4–6 by 1–1¼ in., gradually narrowed into the petiole, glossy when young; stipules interpetiolar separating in a ring with 4 teeth. Common peduncle rather slender, longer than the petioles, axillary, bracteate in the middle; bract caducous, of 2–4 connate parts. Flowers $\frac{1}{12}$–$\frac{1}{5}$ in. long, sessile; receptacle hairy; paleæ spathulate, hairy. Calyx 5-fid. Corolla pubescent, 5-lobed; limb $\frac{1}{16}$ in. diam. Stamens 5. Stigma glabrous, globose.—*Nauclea microcephala,* Del. Cent. Pl. Mér. p. 67, n. 54 (1826); DC. Prodr. iv. p. 345; Schweinf. Beitr. Fl. Æthiop. p. 138, n. 709 (1867).

Nile Land. Sennaar, at Singue, *Cailliaud;* Fesoghlu, *Cienkowsky.*

3. **MITRAGYNE,** Korth. Obs. Naucl. Ind. p. 19 (1839), non Br.
(*Stephegyne,* Korth.; Benth et Hook. f. Gen. Pl. ii. p. 31.)

Flowers crowded in compact globose heads with paleaceous bracteoles at the base. Calyx-tubes contiguous, obconical, with a short free glabrous rim, truncate or obscurely 5-toothed, without appendages. Corolla narrowly funnel-shaped, 5-lobed, valvate in æstivation. Stamens 5, glabrous inserted at or near the mouth of the corolla; filaments short; anthers lanceolate-oblong. Disk annular. Ovary 2-celled; style filiform, exserted; stigma oblong or subcapitate; ovules numerous. Fruit di-coccous. Seeds numerous, small, winged at both ends.—Trees or shrubs with subterete or obtusely quadrangular branchlets, opposite subcoriaceous leaves, interpetiolar fugacious stipules, and solitary or cymose heads of white or yellow flowers.

A small genus found also in Tropical Asia.

Flowering heads solitary. Corolla glabrous outside, bearded at the throat. Anthers included, erect	1. *M. africana.*
Flowering heads cymose. Corolla-limb hairy outside, glabrous at the throat, anthers exserted, drooping	2. *M. macrophylla.*

1. **M. africana,** *Korth. Obs. Naucl. Ind.* p. 19 (1839). Ranging in size from a bush of 6 ft. to a tree of 20–40 ft. Glabrous or somewhat pubescent. Leaves ovate-elliptical, obtusely acuminate or narrowed at the apex, rounded or excavated or obtusely wedge shaped at the base, with 6–7 glabrous or sparingly pubescent veins on each side of the midrib, 2–4 by ¾–2 in., on petiole of $\frac{1}{5}$–$\frac{4}{5}$ in.; stipules lanceolate-oblong or ovate, obtuse sheathing coloured $\frac{1}{3}$–1 in. long fugacious. Flowering heads solitary, subsessile or pedunculate, about 1 in. diam. Corolla white, turning yellow, fragrant, glabrous outside, throat bearded, about $\frac{1}{3}$ in. long; lobes obtuse. Anthers just exserted, drooping. Stigma red.—*Uncaria inermis,* Willd. in Usteri Delect. ii. p. 199, t. 3 (1793). *Nauclea africana,* Willd. Sp. Pl. i. p. 929 (1797); DC. Prodr. iv. p. 345, (1830); non Cham. et Schlecht. in Linnaea iv. p. 148 (1829) nec Walp. *N. platanocarpa,* Planch. (*Platanocarpum africanum* Hook. f.) in Hook. Ic. t. 787. *Stephegyne africana,* Walp. Repert. ii. p. 513. Benth. in Hook. Niger Fl. p. 380, t. 37. *Cephalanthus africanus,* Reichenb. in Sieber Pl. exs. Seneg. n. 20!

Upper Guinea. Guinea, *Thonning, Isert;* Sierra Leone, *Afzelius! Don!*

Senegambia, *Bacle, Perrottet;* Niger, *Ansell!, Th. Vogel!;* Nupe, *Barter!*; Gambia, *Dr. Mackenzie Skues!*

Nile Land. By Gazelle River, *Schweinfurth!*

Grows in moist places. The wood is used for carving.

2. **M. macrophylla,** *Hiern.* A tree from 20 ft. upwards to 50 ft., sometimes of vast size with very stiff trunk, shining, nearly glabrous or somewhat hispid. Leaves elliptical, often broadly so, thinly coriaceous or papery, rounded or sometimes shortly acuminate at apex, obtuse or rounded or sometimes wedge-shaped at base, with 8–10 veins on each side of the midrib, 3–21 by 2–15 in.; petiole $\frac{1}{2}$–$2\frac{1}{4}$ in.; stipules obovate, $1\frac{1}{4}$–4 in. Flowering heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam., cymose, often umbellate. Calyx with shallow lobes, ciliate (quite entire according to De Candolle). Corolla $\frac{1}{6}$–$\frac{1}{5}$ in. long, greenish white, fragrant; limb shortly pale-pilose-tomentose outside; throat glabrous; lobes with filiform fragile tips. Anthers included, erect. Fruiting heads $\frac{1}{2}$–1 in. diam. — *Nauclea stipulosa,* DC. Prodr. iv. p. 346. *N. macrophylla,* Perr. et Lepr., non Roxb. nec Blum., ex DC. *l. c.* *N. stipulacea,* G. Don Gen. Syst. iii. p. 469. *N. bracteosa,* Welw. Synops. Explicat. p. 48, n. 130 (1862). *Stephegyne,* sp., sub. nom. specif. *stipulata,* Benth. et Hook. f. Gen. Pl. ii. p. 31.

Upper Guinea. Gambia, *Leprieur;* Sierra Leone, *Afzelius!;* River Nun, 1° N. lat., *Mann!;* Niger, *Barter!;* Fernando Po, *Th. Vogel!;* Quorra, *Barter!*.

Nile Land. Niamniam-land, *Schweinfurth!* Djur-land, *Schweinfurth!*

Lower Guinea. Golungo Alto, *Welwitsch!*

4. **UNCARIA,** Schreb.; Benth. et Hook. f. Gen. Pl. ii. p. 31.

Flowers crowded in rather loose globose heads, usually pedicelled, without intervening bracteoles. Calyx-tubes not cohering, at length fusiform; limb campanulate, 5-lobed. Corolla funnel-shaped with an elongated tube, valvate in æstivation. Stamens 5, inserted at the throat of the corolla; filaments short; anthers shortly oblong, cells more or less produced, or in some species setose at the base. Disk inconspicuous. Ovary fusiform, 2-celled; style exserted; stigma clavate or capitate; ovules numerous, ascending. Capsule septicidal, many seeded; testa produced at both ends into capillary appendages. —Climbing shrubs with opposite, interpetiolar fugacious stipules, and lower peduncles usually transformed into recurved spines.

A genus of several species including, besides the following, one from Guiana and several from Tropical Asia.

1. **U. africana,** *G. Don, Gen. Syst.* iii. p. 471, n. 18. A glabrous or sparingly pubescent shrub 4–40 ft. high. Leaves ovate-oval or lanceolate, acuminate, rounded at the base or nearly so, thinly coriaceous, with 5–7 lateral veins on each side of the midrib, shortly petiolate, 2–6 by 1–4 in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. long, usually bipartite with narrow partitions. Spines at first nearly straight, afterwards crooked. Flowering heads $1\frac{1}{2}$–2 in. diam. Calyx tawny, as well as the corolla shortly and appressedly pilose-tomentose; limb shortly lobed. Corolla about $\frac{1}{2}$ in. long, greenish yellow. Stamens glabrous; anther-cells obtusely produced at base. Fruiting heads 3–$3\frac{1}{2}$ in. diam.; pedicels

¾ in, ; capsules ⅔ in. Tails of the seeds linear-setaceous, undivided at one end, bipartite at the other.—Hook. Ic. t. 781. Benth. in Hook. Niger Fl. p. 381, t. 42. *Nauclea africana*, Walp. Repert. ii. p. 512, n. 21, non Willd. nec Cham. et Schlecht.

Upper Guinea. Sierra Leone, *Afzelius!*, *G. Don!*, *Th. Vogel!*, *Barter!*, *Stormont!*: River Muni, 1° N. lat., *Mann!*

North Central. Monbuttu-land, *Schweinfurth!*

A specimen from the Comoro Islands, collected by Bojer!, appears to belong to this species.

5. **HYMENODICTYON**, Wall.; Benth. et Hook. f. Gen. Pl. ii. p. 35.

Calyx-tube subglobose; lobes 5, linear or lanceolate, entire, deciduous. Corolla funnel-shaped; tube much narrowed at the base; limb 5-cleft, valvate in æstivation. Anthers 5, subsessile, inserted rather below the throat of the corolla, included. Disk annular. Ovary 2-celled; style filiform exserted; stigma oblong-capitate; ovules numerous, ascending. Capsule oblong or fusiform, 2-celled, loculicidal. Seeds numerous; testa produced into membranous dentate elongated wings, undivided at one end bipartite at the other end.—Trees or shrubs with opposite petiolate leaves, deciduous stipules, foliaceous reticulated marcescent long-petiolate bracts, and terminal spicate fascicles.

A small genus occurring also in Tropical Asia.

Leaves puberulous on the veins beneath. Calyx-lobes linear-lanceolate, $\frac{1}{15}$ in. long	1. *H. Kurria.*
Leaves glabrous. Calyx-lobes narrowly linear, $\frac{1}{12}$ in long .	2. *H. biafranum.*

Hymenodictyon (sp.), Thoms. in Speke Journ., App., p. 636; Oliv. in Trans. Linn. Soc. Lond. xxix. p. 82; is too imperfect for description; it differs from the type of the genus by its lateral inflorescence without persistent bracts, and by the bifid valves of the fruit. It was gathered at Madi.

1. **H. Kurria,** *Hochst. in Flora* 1843, p. 71. A low tree or shrub of 8–10 ft. Leaves obovate or nearly oval, acuminate, wedge-shaped at base into the petiole, glabrate above, puberulous on the midrib veins and veinlets beneath or obsoletely so, with 7–9 veins on each side of the midrib; 3–8 by 1½–4¼ in.; petiole ⅓–1⅔ in.; upper internodes short; stipules ovate-oblong, ½ in. long. Bracts opposite, elliptical, narrowed at both ends, 2¼ by ⅝ in., on stalks of 1 in. Inflorescence 3½–7 in long, dense (in the type). Calyx-lobes linear-lanceolate, $\frac{1}{15}$ in. long. Corolla ⅕ in. long. Capsule ⅓–½ by ⅕–¼ in., on stalks of ⅛–⅕ in.—*Kurria floribunda*, Hochst. et Steud. in Flora 1842, p. 234.

Nile Land. Abyssinia, *Schimper!*

Var. *elongatum* Schweinf. mss. (sp.). Spikes longer (7 in.), less dense than the type. Niamniam-land, *Schweinfurth!*, alt. nearly 4000 ft.

Lower Guinea. Pungo Andongo, *Welwitsch!*

2. **H. biafranum,** *Hiern.* A shrub or small tree of 30 ft. Leaves glabrous, obovate-oval, shortly acuminate, narrowed towards the base,

with 6–7 slender lateral veins on each side of the midrib; 2–6 by 1–3 in.; petiole $\frac{1}{4}$–$\frac{2}{3}$ in.; upper internode rather short; stipules short, rounded. Bracts opposite elliptical 2–3 by $\frac{3}{4}$–1, pure white, on stalks of about 1 in. Inflorescence 3–6 in., dense; pale purple. Calyx-lobes narrowly linear, $\frac{1}{12}$ in. long. Corolla $\frac{1}{4}$ in. long. Capsule $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., on stalks of $\frac{1}{4}$–$\frac{3}{8}$ in. Wings of the seeds much elongated.

Upper Guinea. Princes Island, *Barter!* (rocky islets); Cameroons Mountains, alt. 4500 ft., *Mann!*

Fruits in February.

6. **CORYNANTHE**, Welw.; Benth. et Hook. f. Gen. Pl. ii. p. 36.

Calyx-tube ovoid or sub-globose; lobes 5, lanceolate-subulate, persistent. Corolla funnel-shaped; lobes 5, flat, widely ovate, subacute, furnished at the back near the apex with an elongated club-shaped appendix, induplicate-valvate in æstivation. Stamens 5, inserted at the throat of the corolla; anthers sessile, glabrous, exserted, linear-oblong; cells elongated at the base. Ovary 2-celled; style filiform; stigma just exserted, clavate; ovules numerous, ascending. Capsule oblong, coriaceous, loculicidally bivalved. Seeds numerous, compressed; testa produced into elongated repand-dentate membranous wings, undivided at the apex, bipartite at the base.—Monotypic. A tree or large shrub, glabrous in most parts, with opposite petiolate, coriaceous, evergreen leaves, elongated caducous stipules, and small whitish flowers arranged in a terminal trichotomous panicle, the lowest branches of which however are verticillate.

1. **C. paniculata,** *Welw. in Trans. Linn. Soc. Lond.* xxvii. p. 37, t. 14 (1869). A tree of 25–40 ft. or a shrub of 12–15 ft. Leaves oblong somewhat obovate or ovate-lanceloate, obtusely acuminate, narrowed at the base, with 7–8 lateral veins on each side of the clearly marked midrib, 2–5 by $\frac{2}{3}$–$2\frac{1}{3}$ in.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules ovate-lanceolate, rather obtuse. Inflorescence ovoid, about 3–4 in. long and wide. Capsule $\frac{1}{4}$–$\frac{3}{8}$ by $\frac{1}{10}$–$\frac{1}{6}$ in. Seeds $\frac{1}{5}$ in. long.

Lower Guinea. Golungo Alto, Cazengo and Dembos, *Welwitsch!* (a magnificent tree, with the habit of *Olea latifolia;* Congo, *Chr. Smith!* (a shrub of 12–15 feet).

See Welwitsch, Apontamentos, p. 568 (1859). Cfr. *Rubiacea,* Welw. l. c. p. 590, post n. 95.

The timber is good for building.

7. **CROSSOPTERYX**, Fenzl; Benth. et Hook. f. Gen. Pl. ii. p. 41.

Calyx short, broadly oblong, with 4–6 short obtuse erect deciduous lobes. Corolla salver-shaped, hairy outside, glabrous inside; tube slender, straight; limb spreading 4–6 lobed, dextrorsely contorted in æstivation (as seen from inside). Stamens 4–6, subsessile, glabrous, inserted at the throat of the corolla; anthers lanceolate, oblong, apiculate; cells apiculate at base. Disk annular. Ovary 2-celled; style filiform, exserted; stigma clavate, bilobed; cells with several ovules peltately attached. Capsule crustaceous, globose, 2-celled,

loculicidal. Seeds several, peltate, compressed, with cut membranous wings.

A genus limited to this flora, with opposite shortly petiolate leaves, interpetiolar deltoid-acuminate stipules, and corymbosely panicled terminal inflorescence.

1. **C. Kotschyana,** *Fenzl! in Endl. & Fenzl Nov. Stirp. Dec.*, p. 46, n. 51 (1839). A bushy tree or shrub with brittle wood and subterete pubescent or glabrate branches. Leaves broadly oval ovate or elliptical, more or less acuminate, thinly coriaceous, deep green, usually obtuse at the base; 1–8 by $\frac{1}{2}$–3 in.; petiole $\frac{1}{8}$–$\frac{3}{8}$; stipules $\frac{1}{8}$–$\frac{2}{5}$ in. Panicle corymbose or rounded, dense, 2–4 in. diam. Corolla $\frac{1}{4}$–$\frac{1}{3}$ in. long, fragrant, white cream-coloured or pink. Capsule $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; seeds $\frac{1}{10}$–$\frac{1}{6}$ by $\frac{1}{12}$–$\frac{1}{10}$ in.—Kotschy et Peyritsch Pl. Tinneanæ, p. 32, tt. 15^a, 15_b. *Rondeletia febrifuga*, Afzel. ex G. Don Gen. Syst. iii. p. 516. *R. africana*, T. Winterbottom, Account of Sierra Leone ii. p. 46 (1803). *C. febrifuga*, Benth. in Hook. Niger Fl. p. 381.

Upper Guinea. Sierra Leone, *Afzelius!, G. Don!, Wilford!, Hutton!, Purdie!*, Senegambia, *Hendelot!* Niger, Nupe, *Barter!*

Nile Land. Sennaar, *Kotschy*, 532, *Boriani;* Bahr Ghasal, *Heuglin;* Gallabat, *Schweinfurth!;* Djur-land, *Schweinfurth!;* Niam-niam, *Schweinfurth;* Bongo-land, *Schweinfurth!* Madi, *Speke and Grant!*

Lower Guinea. Congo, *Chr. Smith!;* Golungo Alto, *Welwitsch!*

Mozamb. Distr. Senna, *Kirk!*

All the forms of this genus, being connected by continuous links, are here united into one species; they vary much in the degree of pubescence, the original *R. febrifuga* being nearly glabrous. The bark is employed as a febrifuge. Native names at Sierra Leone, "béllenda" and bèmbee (Winterbottom, *l. c.*). For an account of the medicinal virtues of this plant, called African bark, see Winterbottom, *l. c.*, p. 243.

Rondeletia floribunda, G. Don, Gard. Dict. iii. p. 516, n. 17, is *Holarrhena africana*, Alph. DC.; and *R. loniceroides*, G. Don, *l. c.* n. 18 is *Usteria guineensis*, Willd.

8. ARGOSTEMMA, Wall.; Benth. et Hook. f. Gen. Pl. ii. p. 54, n. 75.

Calyx-tube turbinate, exceeding the ovary; limb usually 5-cleft. Corolla rotate; limb usually 5-partite, valvate in æstivation. Stamens usually 5, inserted at or near the base of the corolla; anthers usually connivent, exserted, glabrous. Disk rather thick fleshy. Ovary 2-celled; style slender; stigma capitate; cells many-ovuled. Capsule bursting irregularly at the apex. Seeds minute, numerous.—Small herbs with simple stem opposite or quasi-verticillate leaves, interpetiolar persistent stipules, and white flowers.

A genus of many species; all, except the one following, peculiar to Tropical India.

1. **A. pumilum,** Benn. Pl. Jav. Rar. p. 95. Root fleshy and almost tuberous, short, with capillary fibres. Stem $1\frac{1}{2}$–3 in. high, bearing close together 4–6 pairs of leaves, erect. Leaves subelliptical, obtuse, subsessile, ranging up to $1\frac{1}{2}$ by $\frac{3}{8}$ in., scattered with a few scaly hairs; veins inconspicuous. Inflorescence terminal, 5–1-flowered; pedicels slender ranging up to nearly $\frac{1}{2}$ in. Flowering $\frac{1}{3}$–$\frac{1}{2}$ in. diam.

Anthers obtuse, dehiscing by apical pores.—*Cortusoides*, Afzel. in Hb. Banks. et ex Benn. *l. c.*

Upper Guinea. Sierra Leone, *Afzelius!*; on rocks in the rivers, Sierra del Crystal, 1° N. lat., *Mann!*

Apparently identical with *A. verticillatum*, Wall. in Roxb. Fl. Ind., ed. Carey, ii. 325 (1824), a native of Nipal.

9. **PENTAS,** Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 54.

Calyx-tube campanulate-turbinate, short, ribbed at least in fruit; lobes usually 5, unequal, some usually enlarged at least in fruit, frequently with one or more exterior alternating teeth, persistent. Corolla tubular; tube more or less funnel-shaped above, especially in the flowers with included anthers, bearded within the throat; lobes somewhat unequal, valvate in æstivation. Anthers glabrous, linear-oblong, inserted within or below the throat of the corolla, subsessile in the flowers with included anthers, on slender filaments in those with exserted anthers. Disk sometimes after flowering produced into a depressed cone. Ovary 2–3-celled; style filiform, more or less exserted; ovules numerous. Capsule 2-celled, membranous or coriaceous, loculicidally 2-valved, many-seeded. Valves persistent.—Shrubby herbs or small shrubs with subterete branches and opposite leaves. Stipules multipartite with subulate segments. Flowers cymose, usually dimorphic by the greater or less degree of the exsertion of the style corresponding with the included or exserted stamens.

A small genus limited to Arabia, Africa and African Islands, including Madagascar.

Corolla-limb $\frac{1}{3}$–$\frac{1}{2}$ in. diam. Leaves usually with numerous (12–18) lateral veins on each side of the midrib.
  Indumentum somewhat ferruginous.
    Calyx about equalling the corolla . . . . . 1. *P. Schimperiana.*
    Calyx about half the length of the corolla . . . . 2. *P. occidentalis.*
  Indumentum pallid . . . . . 3. *P. carnea.*
Corolla-limb $\frac{1}{6}$–$\frac{1}{4}$ in. diam. Leaves with usually less numerous (about 8) lateral veins on each side of the midrib.
  Flowers $\frac{3}{8}$–$\frac{1}{2}$ in. long. Leaves dull . . . . . 4. *P. purpurea.*
  Flowers $\frac{1}{3}$ in. long. Leaves shining on the upper surface.
    Habit rambling. Leaves subsessile . . . . . 5. *P. arvensis.*
    Habit erect. Leaves petiolate . . . . . 6. *P. parviflora.*

1. **P. Schimperiana,** *Vatke in Linnæa* xl. p. 192 (1876). Shrubby below, about 2 feet high. Pubescence short subferruginous. Leaves narrowly elliptical or ovate, narrowed at both ends, many (12–18) nerved, 2–6 by $\frac{1}{2}$–2 in.; petiole ranging up to nearly $\frac{1}{2}$ in. Cymes corymbose, mostly sessile. Flowers shortly pedicelled, $\frac{1}{2}$ in. long. Calyx about equalling the corolla, all the lobes subulate or narrowly lanceolate, rose-coloured. Corolla pale rose-coloured, shaggy within the throat; limb nearly $\frac{1}{2}$ in. diam. Anthers (in our specimens) exserted. Fruit $\frac{1}{4}$ in. diam.—*Vignaldia Schimperiana*, A. Rich. Fl. Abyss. i. 358 (1847); *Mussænda Schimperi*, Hochst. in Hb. Schimp. Abyss. i. n. 38, ii. nn. 838, 916.

Nile Land. Abyssinia, *Schimper! Roth! Parkyns! Quartin Dillon!*

2. **P. occidentalis,** *Benth. et Hook. f. Gen. Pl.* ii. 54. A small shrub, 3–4 feet high. Pubescence short, subferruginous. Leaves ovate, acute, nearly rounded or narrowed at the base, many- (about 12-) veined, 1–4 by $\frac{1}{2}$–2 in.; petiole ranging up to $\frac{1}{2}$ in. Cymes rather dense, corymbose, 1–3 in. diameter, mostly sessile. Flowers subsessile. dimorphous, $\frac{2}{3}$–$\frac{3}{4}$ in. long. Calyx $\frac{1}{4}$–$\frac{1}{3}$ in. long, lobes all subulate, Corolla bearded within the throat; limb $\frac{3}{8}$ in. diameter.—*Vignaldia occidentalis*, Hook. f. in Journ. Linn. Soc. vii. 197.

Upper Guinea. Cameroons Mountains and Ferando Po, 7000–8500 feet alt., *Mann!*

3. **P. carnea,** *Benth. in Bot. Mag.* t. 4086 (1844). An erect or decumbent perennial, almost or quite shrubby below, 1–2 feet high, shortly and rather harshly puberulous, pallid. Leaves ovate elliptical or lanceolate-oblong, acute or subacute at the apex, narrowed at the base into the short petiole, 1–6 by $\frac{3}{8}$–2 in.; lateral veins numerous (12–18). Cymes dense or rarely rather lax, 1–3 in. diameter, sessile or pedunculate. Flowers subsessile, pale purple, $\frac{2}{3}$–1 in. long, dimorphic. Calyx $\frac{1}{6}$–$\frac{1}{2}$ in. long or more. Corolla densely hairy at the throat; limb $\frac{1}{3}$–$\frac{1}{2}$ in. diameter.—Bot. Reg. xxx. t. 32 (1844). *Sipanea carnea*, Hort. ex Hook. in Bot. Mag. l.c. *Mussænda luteola*, Hochst. in Hb. Schimp. Abyss. iii. n. 1917, DC. Prodr. iv. p. 371, syn. sub n. 9 (1830), non Del. *Ophiorrhiza lanceolata*, Forsk! Fl. Ægypt.-Arab. p. 42 n. 39 (1775); *Manettia lanceolata* Vahl, Symb. i. 12 (1790); *Neurocarpæa lanceolata*, Br.! in Salt Abyss. App. (iv.) p. lxiv. (1814); *Vignaldia Quartiniana*, A. Rich. Fl. Abyss. i. 357; *P. Quartiniana*, Oliv. in Trans. Linn. Soc. Lond. xxix. p. 82, t. 46 (1873); *Pentanisia nervosa*, *P. cymosa*, and *P. suffruticosa*, Klotzsch in Peters Mossamb. pp. 287–288, i.e. *Pentas Klotzschii*, Vatke in Oesterr. Bot. Zeitschrift xxv. p. 231 (1875).

Nile Land. Abyssinia, *Quartin Dillon, Schimper! Plowden! Salt, Pearce! Parkyns!*; rocks at Madi and Ukidi, *Speke and Grant!*; Somali-land, *Hildebrandt!* (*var.* with decumbent woody branches, small leaves, slender corolla-tubes, limb $\frac{1}{3}$ in. diam.)

Lower Guinea. Angola, Walp. Repert. vi. p. 57 (1846–7).

Mozamb. Distr. Kilima-Njaro, *Rev. C. New!* (a poor specimen with flowers $1\frac{1}{3}$ in. long, apparently referable to this species); Zanzibar Island, *Hildebrandt!* 1124 (an undershrub, a metre high, with purple flowers, very like some forms of *P. purpurea*).

Occurs also in the Comoro Islands, and among the mountains of Arabia.

4. **P. purpurea,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 83 (1873). An erect perennial, 1–3 feet high somewhat shrubby at the base with wiry deeply set rootstock. Stem branches and leaves more or less pubescent or somewhat hispid. Leaves lanceolate ovate or narrowly elliptical, acute at the apex, attenuated or sometimes obtuse or rounded subsessile or shortly petiolate at the base; 1–4$\frac{1}{2}$ by $\frac{1}{4}$–1$\frac{1}{2}$ in. Cymes dense subglobose or hemispherical, 1–2 in. diameter mostly sessile. Flowers subsessile, purple or lilac, $\frac{3}{8}$–$\frac{1}{2}$ in. long, dimorphic. Calyx hairy or nearly glabrous, $\frac{1}{6}$–$\frac{1}{4}$ (or in fruit $\frac{3}{8}$ or more) in. long. Corolla pilose at the throat; limb $\frac{1}{5}$–$\frac{1}{4}$ in. diameter. Filaments of the

exserted anthers slender, of the included anthers obsolete.—*Pentanisia zanzibarica*, Klotzsch in Peters Mossamb. p. 286; *Pentas zanzibarica*, Vatke in Oesterr. Bot. Zeitschr, xxv. p. 232 (1875); *Vignaldia*, sp. 2, T. Thoms. in Speke, Journ., App. p. 636.

Nile Land. Usui, ° 41′ S. Lat, alt. 4000 feet, *Speke and Grant!*

Mozamb. Distr. Zanzibar Island, *Peters! Speke and Grant!; Hildebrandt!* (flowers lilac); Mombas, *Kirk! Bojer!;* Pemba Island, *Bojer!;* Manganja Hills, near M'bame villages and near Soche Hill, alt. 3000 feet, *Kirk!*

There appears to be a continuity between this and the previous species.

Var. *grandiflora* (*Vignaldia Quartiniana*, var. *grandiflora*, Schweinf. Beitr. Fl. Æthiop. p. 140 (1867). Corolla-tube $1\frac{1}{5}$ in. long, segments $\frac{2}{5}$–$\frac{1}{2}$ by $\frac{1}{5}$ in.; calyx $\frac{3}{5}$ in. long; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long.

Nile Land. Abyssinia, hills near Bellaka, at 7000 feet alt., *Schimper.*

5. **P. arvensis,** *Hiern.* An erect rigid perennial, woody at the crown of the root, about 2 feet high, puberulous. Leaves elliptic-lanceolate, obtuse, narrowed to a subsessile base, 1–4 by $\frac{1}{4}$–1 in.; lateral veins 6–8 on each side. Cymes 1–3 in. diameter; primary branches longer than in most species. Flowers $\frac{1}{3}$ in. long, subsessile. Calyx about $\frac{1}{8}$ in. long. Corolla white; throat violet, hairy within, about $\frac{1}{8}$ in. diameter. Anthers (in our specimens) included.

Nile Land. Mittu-Land, near Derago, in fields, *Schweinfurth!*

6. **P. parviflora,** *Benth. in Bot. Mag. sub.* t. 4086. A winding shrubby perennial, somewhat shining. Leaves narrowly elliptical, acute at both ends, puberulous on the veins beneath; 2–3 by $\frac{1}{2}$–1 in.; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. Cymes dense $\frac{1}{2}$–1 in. diameter, pedunculate. Flowers $\frac{1}{3}$ in. long, subsessile, bluish. Calyx about $\frac{1}{8}$ in. long. Corolla hairy at the throat; limb about $\frac{1}{6}$ in. diameter. Anthers (in our specimens) included.

Upper Guinea. Niger, Accra, *Th. Vogel!*

10. **VIRECTA,** Afzel.; Benth. et Hook. f. Gen. Pl. ii. p. 55.

Calyx hispid; tube campanulate or at length subglobose; lobes 5–4, unequal, persistent. Corolla-tube slender below, narrowly funnel-shaped above, exceeding the calyx; lobes 5–4, spreading; throat glabrous. Stamens 4–7, inserted on the throat of the corolla; filaments slender; anthers linear, exserted more or less. Disk consisting of 2 elongated conical glands or of 1 truncated cone. Ovary 2-celled; style filiform, more or less exserted; stigma subcapitate or bifid; ovules numerous. Capsule globose, loculicidally bivalved, one valve deciduous, the other persistent.—More or less hairy herbs with terete branches, opposite shortly petiolate leaves and tender often dimorphic fasciculate densely cymose flowers.

A genus peculiar to this Flora.

Disk consisting of two narrow cones. Flowers unilateral on the branches of the cymes. Stipules two together . .	1. *V. multiflora.*
Disk consisting of one truncated cone. Flowers fascicled. Stipules solitary. Stipules entire, without setaceous teeth. Leaves ovate. Flowers pentamerous	2. *V. procumbens.*

Leaves linear-spathulate or oblanceolate. Flowers tetramerous . . . . . 3. *V. angustifolia.*
Stipules terminated by 3–4 setaceous teeth . . . . . 4. *V. setigera.*

1. **V. multiflora,** *Smith in Rees Cycl.* xxxvii. n. 4. A trichotomously branched and divaricate rigid herb, 1–3 feet high, patently pilose and appressedly pubescent. Leaves lanceolate, acute, attenuate to a shortly petiolate base; $\frac{1}{2}$–3 by $\frac{1}{5}$–1 in.; stipules 2 together, narrowly lanceolate. Cymes $\frac{1}{4}$–1 in. long; branches crowded, spiciform. Flowers unilateral, about $\frac{1}{2}$ in. long, white or pink, very shortly pedicellate. Calyx-lobes 5, filiform, setose-pilose, unequal, the longest $\frac{1}{4}$ in. long or more. Corolla-tube narrowly funnel-shaped; lobes narrowly lanceolate, pilose outside. Filaments long, slender. Disk consisting of two diverging or erect narrow cones. Style much exserted.—*Phyteumoides hirsuta*, Smeathm. ex DC. Prodr. iv. p. 414 (1830).

Upper Guinea. Niger, *Barter!;* Sierra Leone, *Smeathman! Dr. Barry! Guest! Afzelius!* (in Hb. Smith).

Sipanea angustifolia, A. Rich. ex DC. Prodr. iv. p. 414 et in Mém. Soc. Hist. Nat. Par. v. p. 276 (1834), from the coast of Angola has been doubtfully referred to this species; it is unknown to me, but the characters given do not agree.

2. **V. procumbens,** *Smith in Rees Cycl.* xxxvii. n. 2. Stem procumbent at least in some states, elongated, more or less hirsute. Leaves ovate, scarcely acute, narrowed at the base, appressedly-hairy especially beneath; $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{6}$–$\frac{2}{3}$ in.; petiole pubescent, $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules solitary, entire, narrow. Flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long, fasciculate in the uppermost axils, shortly pedunculate, pentamerous, apparently dimorphic. Calyx-lobes spathulate, pilose-ciliate at the apex. Corolla bristly; lobes narrowly lanceolate, acute, $\frac{1}{5}$ in. long. Stamens 5–7, prominent; anthers purplish. Disk consisting of a truncate cone. Fruit subglobose $\frac{1}{10}$ in. diameter.—*Virecta*(sp.), Afzel. ex Sm. *l.c.*

Upper Guinea. Sierra Leone, *Afzelius! G. Don!;* Bagroo River, *Mann!*
Lower Guinea. Congo, *Chr. Smith!* ? Angola *ex A. Richard.*

Sipanea elatior, A. Rich. ex DC. Prodr. iv. p. 415 et in Mém. Soc. Hist. Nat. Par. v. p. 276 (1834), i.e., *Virecta? elatior*, DC. Prodr. iv. p. 415, i.e. *Pentas elatior*, Benth. in Hook. Niger Fl. p. 402 ex Walp. Repert. vi. p. 57 (1846–7), has been doubtfully referred to this species, but the characters given do not agree.

3. **V. angustifolia,** *Hiern.* Erect herb, 2–4 in. high, with fibrous apparently annual root, simple or with few spreading pilose-hispid branches. Leaves linear-spathulate or oblanceolate, obtuse, glabrous or nearly so above, sparingly pilose-hispid beneath, attenuate at the base; $\frac{1}{2}$–2 by $\frac{1}{8}$–$\frac{1}{3}$ in.; petiole ranging up to $\frac{1}{5}$ in.; stipules solitary, entire, small. Flowers few together, shortly pedunculate in the upper axils, $\frac{1}{4}$ in. long, tetramerous. Calyx-lobes linear or narrowly lanceolate, falling far short of the glabrous corolla. Corolla-lobes lanceolate. Disk consisting of a truncated cone. Fruit subglobose, $\frac{1}{10}$–$\frac{1}{8}$ in. diameter.

Upper Guinea. Sierra del Crystal, on rocks in rivers, 1° N. Lat., *Mann!*

4. **V. setigera,** *Hiern.* Creeping or prostrate herb; branches often rooting below, shortly pubescent above, ranging up to a foot in height.

Leaves oval or somewhat ovate, obtuse or apiculate, more or less narrowed at the base, glabrescent above, shortly pubescent on the nerves beneath; $\frac{1}{3}$–1 by $\frac{1}{5}$–$\frac{3}{5}$ in.; petiole ranging up to $\frac{1}{4}$ in.; stipules solitary, with 3–4 long setaceous teeth from the wide base. Flowers densely fascicled, sessile, about $\frac{1}{6}$ in. long, 4–5-merous. Calyx-lobes unequal foliaceous green. Corolla white. Disk small annular, somewhat elevated in fruit into a short cone.

Upper Guinea. Fernando Po, *Barter! Mann!* Bagroo River, *Mann!*

UNKNOWN SPECIES.

Virecta paniculata, G. Don Gen. Syst. iii. p. 521, n. 5, a shrub from Sierra Leone, appears not to belong to the genus, but I do not know the plant.

11. OTOMERIA, Benth.; Benth. et Hook. f. Gen. Plant. ii. p. 55.

Calyx-tube campanulate, at length turbinate, costate, persistent; limb 5-lobed, irregular by the lengthening of the outermost lobe. Corolla-tube elongated, slender; limb subregular, spreading, 5-partite, valvate in æstivation; throat more or less hairy. Stamens 5, inserted at the throat of the corolla, exserted or included; anthers linear-oblong. Disk fleshy. Ovary 2-celled; style filiform, bilobed at tip; ovules numerous. Capsule septicidally 2-coccous.—Erect ascending or procumbent perennials, more or less shrubby at least at the base, with opposite membranous leaves, 3-multi-setose shortly sheathing stipules, and geminate spicate often dimorphic flowers.

Besides the following, Bentham and Hooker l. c. allude to a species from Madagascar. Probably the flowers are dimorphic, by the included or exserted anthers associated with greater or less degree of elongation of the style in all the species, but, so far as our material shows, *O. guineensis* and *O. dilatata* have included anthers, while the other two species are seen to be dimorphic.

Stipules plurisetose . . . . . 1. *O. guineensis.*
Stipules with about 3 lanceolate or subulate teeth.
  Leaves elliptical, wedge-shaped at the base . . . . . 2. *O. madiensis.*
  Leaves ovate-lanceolate, $\frac{2}{3}$–$1\frac{1}{4}$ in. wide, from a broad nearly rounded base . . . . . 3. *O. dilatata.*
Stipules with about 3 needle-shaped setæ; leaves lanceolate, not exceeding $\frac{1}{2}$ in. wide, attenuate at the base . . . . . 4. *O. lanceolata.*

1. **O. guineensis,** *Benth. in Hook. Niger Fl.* 405. Somewhat shrubby, hirsute above, 1–2 ft. high, branched. Leaves ovate, rather obtusely pointed or apiculate, narrowed at the base, puberulous on the veins above, hairy on the veins beneath; $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{4}{5}$ in.; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. long; stipules plurisetose, pilose-hirsute. Spikes solitary or three together, 3–12 in. long. Flowers about $\frac{3}{8}$ in. long, crowded above, more distant below. Calyx nearly glabrous, the long lobe $\frac{1}{6}$–$\frac{1}{5}$ in. long, the small lobes short. Capsule about $\frac{1}{6}$ in. long.

Upper Guinea. Niger, Grand Bassa, *Th. Vogel! Ansell! Dr. McWilliam!*

2. **O. madiensis,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. 83, t. 47 (1873). Decumbent or ascending, 1–$2\frac{1}{2}$ ft. high, somewhat shrubby

Mo. Bot. Garden,
1902.

at base. Branches hispid or pubescent or glabrescent. Leaves elliptical, usually narrowed at both ends, especially towards the base, hairy at least on the veins beneath; 1½–5½ by ⅓–2¼ in., shortly petiolate; stipules hairy, usually of one central lanceolate-subulate segment of ¼–⅓ in. and two lateral smaller subulate segments. Spikes terminal, solitary or branched, a foot long or more. Flowers ¾–1 in. long, shortly pedicellate, dimorphic. Calyx hispid or glabrate, the long lobe ⅕–½ in. long. Corolla-tube more or less bearded. Capsule ⅕–¼ in. long.—*Otomeria*, sp., T. Thoms. in Speke, Journ., App. p. 636.

North Central. Monbuttu-land, *Schweinfurth!* (Corolla crimson outside, pink inside.)

Nile Land. Open ground at Madi, *Speke and Grant!* 691 (Corolla pink except the inside, which is white); Niamniam-land, near Bendo, *Schweinfurth!*

3. **O. dilatata,** *Hiern.* Erect robust herb, 2 ft. high. Stem more or less hirsute. Leaves ovate-lanceolate from a broad nearly rounded base, narrowed to a rather obtuse apex, hirsute or nearly glabrous; 2–4 by ⅔–1¼ in., shortly petiolate; stipules of about three narrowly lanceolate or subulate hirsute or ciliate teeth. Spikes 6–12 in. long. Flowers 1 in. long. Calyx-tube in fruit ribbed, ¼–⅜ in. long; long lobe ½–⅔ in. Corolla bright scarlet.

Upper Guinea. Niger, swampy places, in Northern Nupe, *Barter!*

4. **O. lanceolata,** *Hiern.* Somewhat shrubby, branched, glabrous or glabrescent in most parts. Branches rather slender, stiff. Leaves lanceolate, mostly acute, attenuate at the base into a short petiole, sub-fasciculate, ranging up to 2¼ by ½ in.; stipules of about three needle-shaped setæ. Spikes 3–13 in. long. Flowers ¾ in. long, dimorphic. Calyx-tube ribbed in fruit, ⅙–⅕ in. long; long lobe ¼–⅓ in. long.

Lower Guinea. Congo, *Chr. Smith! Burton!* (Wild Diamba.)

Probably the second species of *Neurocarpæa* (Pentas) which is the fourth new genus of Rubiaceæ mentioned by Brown in the appendix to Tuckey's Congo, page 448 (1818).

12. DIRICHLETIA, Klotzsch; Benth. et Hook. f. Gen. Plant. ii. p. 56.

Calyx-tube small, campanulate; limb developed into an oblique dilated reticulated shallowly concave entire or lobed lamina, at length whitened. Corolla-tube elongated, slender, usually hirsute inside; limb 5-lobed, valvate in æstivation. Stamens 5, inserted at the throat of the corolla, included or exserted; anthers linear-oblong. Disk fleshy. Ovary 2-celled; style filiform; stigma bipartite; ovules numerous. Fruit oblong, costate, attenuate at the base, dicoccous.—Glabrous or pubescent undershrubs with subterete branches, opposite shortly petiolate leaves, tricuspidate or 3–5-setose very shortly sheathing stipules, corymbose cymes, and often dimorphic flowers.

A small genus peculiar to Eastern Africa and to Madagascar.

Corolla tube 1–1½ in. long. Leaves acuminate-acute.	
More or less pubescent	1. *D. pubescens.*
Glabrous	2. *D. glabra.*
Corolla-tube ½ in. long. Leaves obtuse, not acuminate	3. *D. glaucescens.*

1. **D. pubescens,** *Klotzsch in Bericht, Berlin,* 1853, p. 495. A bush of 1–7 ft. high; stem ¾ in. thick. Young parts and lower side of the leaves more or less pubescent. Leaves elliptical, narrowed at both ends, 1–3 by ⅓–1 in.; veins rather conspicuous; stipules setose. Calyx-limb about ⅔–1⅙ by ½–¾ in., vaguely 3-lobed or nearly or quite entire. Corolla-tube 1–1½ in. long. Anthers included or exserted.—Klotzsch in Peters, Mossamb. Bot. t. 48.

Mozamb. Distr. Tette, *Peters! Kirk!;* between Lupata and Tette. *Kirk!*

2. **D. glabra,** *Klotzsch in Bericht.* A glabrous shrub, 4–5 ft. high. Leaves ovate-lanceolate, mostly acuminate-acute, wedge-shaped at the base, chartaceous; 2–3 by ⅝–1 in.; lateral veins slender, inconspicuous; petiole about ¼ in. long; stipules of 3 linear-subulate segments, shorter than the petiole. Flowers 1½ in. long. Dilated calyx-limb oval-ovate, shortly and obtusely acuminate, 1–1¼ by ½–¾ in. Anthers included. Stigma exserted.—Klotzsch in Peters, Mossamb. Bot. t. 47.

Mozamb. Distr. Querimba Island and mainland, *Peters!*

3. **D. glaucescens,** *Hiern.* A glaucescent bush with patent glabrous branches. Leaves ovate-elliptical, mostly obtuse at the apex and narrowed at the base, ¾–2 by ⅓–⅔ in.; veins inconspicuous; stipules with 3 setose teeth. Calyx-limb ½–⅔ by ¼–⅜ in., with one short rounded tooth on each side. Corolla-tube ½ in. long. Anthers (in our specimen) exserted.

Nile Land. Somali Coast, Tola River, *Kirk!*
Flowers in April.

13. **OLDENLANDIA,** Plumier, Nov. Pl. Amer. Gen. p. 42, t. 36, fig. inf. (1703); *Hedyotis, Pentodon* and *Oldenlandia,* Benth. et Hook. f. Gen. Pl. ii. 56–58.

Calyx-tube globose obovoid turbinate or obconic-oblong; limb small, regular, deeply 4- or rarely 5-lobed, rarely with alternating teeth, persistent. Corolla salver-shaped funnel-shaped campanulate or subrotate, membranous; tube straight or somewhat curved; throat glabrous or bearded; limb 4- or rarely 5-lobed, regular; lobes nearly linear lanceolate ovate oval or oblong, obtuse or acuminate, valvate in the bud. Stamens 4 or rarely 5, inserted at or rather below the throat of the corolla, exserted or included, glabrous; anthers oblong or linear, fixed at the back near the base; filaments short. Disk fleshy, inconspicuous. Ovary 2-celled; style filiform, included or exserted, entire or with 2 short linear branches, glabrous; ovules numerous. Capsule dehiscing longitudinally at or from the apex or dicoccous or tardily dehiscent, small, membranous or coriaceous.

Seeds numerous, small, more or less angular or rarely orbicular, imbedded in the corrugations of, or peltately attached to, the thick placentas; testa thin, smooth or minutely granulated; albumen fleshy or horny; embryo small, clavate. Herbs or shrubs with opposite leaves, acuminate or setose stipules adnate to the petiole or leaf-base, and small or delicate flowers arranged in terminal or axillary panicles or clusters.

A considerable genus found in the hotter parts of both the Old and New Worlds.

- Calyx-segments 4 or rarely 5, without intervening teeth (or occasionally with minute intermediate teeth in *O. globosa*), Capsule dehiscent (or tardily so in *O. wauensis*).
  - Leaves petiolate. Stigma sub-entire. Capsule septicidal, dicoccous. Seeds orbicular . . . . . 1. *O. Peltospermum.*
  - Leaves sessile or subsessile. Style with two short linear stigmatic branches. Capsule loculicidally dehiscent at or from the apex or indehiscent or tardily dehiscent. Seeds angular.
    - Capsule subglobose, dehiscent.
      - Flowers tetramerous.
        - Cymes terminal, densely corymbose or capitate.
          - Leaves lanceolate or sub-linear; stipules truncate, terminated by 4 or 5 subulate setæ. Cymes densely corymbose . . . 2. *O. Bojeri.*
          - Leaves elliptical; stipules ovate, tridentate. Cymes globose . . . . . 3. *O. globosa.*
        - Cymes terminal and lax or elongated or ample, or axillary.
          - Corolla salver-shaped, exceeding the calyx.
            - Leaves lanceolate, faintly nerved. Capsule toughly coriaceous . . . . . 4. *O. decumbens.*
            - Leaves linear or nearly so, uni-nerved. Capsule sub-membranous.
              - Stipules 3–1-cuspidate. Flowers $\frac{2}{5}$–$\frac{2}{3}$ in. long.
                - Corolla-lobes obtuse.
                  - Calyx pubescent . . . . . 5. *O. lasiocarpa.*
                  - Calyx puberulous scabrid or glabrous.
                    - Branches terete. Leaves fasciculate below.
                      - Smooth, glabrous, glaucescent . 6. *O. rigida.*
                      - Glandular-scabrid, dull . . . 7. *O. Schimperi.*
                    - Branches quadrangular. Leaves not fasciculate . . . . . 8. *O. obtusiloba.*
                - Corolla-lobes acute acuminate.
                  - Corolla-lobes linear-lanceolate . . 9. *O. senegalensis.*
                  - Corolla-lobes elliptic-lanceolate . . 10. *O. noctiflora.*
                  - Corolla-lobes oval, apiculate . . . 11. *O. grandiflora.*
              - Stipules truncate or nearly so, setose-ciliate. Flowers $\frac{1}{6}$–$\frac{1}{3}$ in. long.
                - Branches of the inflorescence subspicate in fruit; flowers not fasciculate.
                  - Calyx-teeth linear-subulate, nearly equalling the corolla-tube . . 12. *O. abyssinica.*
                  - Calyx-teeth lanceolate, short . . 13. *O. strumosa.*

Inflorescence cymosely corymbose, or sub-spicately branched with fasciculate flowers.
Setæ of the stipules long, conspicuous, at length reflexed or spreading . . . . . 14. *O. Caffra.*
Setæ of the stipules short, suberect . 15. *O. virgata.*
Flowers solitary or loosely paniculate.
Pedicels long and slender, not rigid; inflorescence terminal . . . . 16. *O. effusa.*
Pedicels rigid, not very long, mostly axillary . . . . . 17. *O. Heynei.*
Corolla funnel-shaped, scarcely exceeding the calyx.
Inflorescence terminal; pedicels fasciculate.
Leaves narrowly linear . . . . . 18. *O. parviflora.*
Leaves linear-oval . . . . . 19. *O. flosculosa.*
Inflorescence axillary, or subterminal with solitary flowers.
Flowers solitary.
Calyx-lobes obtuse . . . . . 20. *O. monanthos.*
Calyx-lobes acute at least in flower.
Closely branched, dwarf . . . . 21. *O. cæspitosa.*
Simple or nearly so, dwarf . . . 22. *O. tenuissima.*
Simple or branched, elongated . . 23. *O. lancifolia.*
Flowers two or more together.
Peduncles solitary, bearing two or more flowers . . . . . 24. *O. corymbosa.*
Peduncles two or more together, each 1-flowered . . . . . 25. *O. capensis.*
Peduncles very short, crowded several together . . . . . 26. *O. trinervia.*
Flowers pentamerous . . . . . 27. *O. macrophylla.*
Capsule obconic-oblong, tardily dehiscent . . . . 28. *O. wauensis.*
Calyx-lobes 4 with intervening subulate teeth. Capsule indehiscent . . . . . 29. *O. hedyotoides.*

1. **O. Peltospermum,** *Hiern.* A glabrate shining shrub climbing to the height of 10–15 feet or arborescent; branches terete, purplish. Leaves ovate or elliptical, narrowed at both ends, membranous, 2–5 by 1–2 in.; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules shortly ovate, wide, undivided, puberulous, terminated by a subulate tooth, soon obliterated. Flowers pentamerous, $\frac{1}{4}$–$\frac{3}{8}$ in. long, 1–3 together, sessile or occasionally one pedunculate, on spikes arranged in terminal panicles 6–12 in. long. Calyx coriaceous, green; tube campanulate, at length subglobose, $\frac{1}{12}$–$\frac{1}{8}$ in. diam., wholly adnate to the ovary; limb short, spreading; teeth short, ovate. Corolla tubular-funnel-shaped, pale blue; limb shortly lobed; throat hairy. Anthers oblong, included. Stigma subclavate, subentire. Capsule coriaceous, at length septicidally dicoccous, $\frac{1}{8}$–$\frac{1}{6}$ in. diam; seeds orbicular, peltately attached to the fleshy placentas.—*Peltospermum paniculatum*, Benth. in Hook. Niger Fl. p. 400; *Hedyotis* (sp.), Benth. et Hook. f. Gen. Pl. ii. p. 57.

Upper Guinea. Fernando Po, *Th. Vogel! Mann! Barter!* Princes Island, *Barter!* Gaboon River, *Mann!* Senegambia, *Heudelot!* Sierra Leone, *Afzelius!*

2. **O. Bojeri,** *Hiern.* A dense undershrub, puberulous, 1–3 feet

high, erect, branched or sometimes simple. Branches subtetragonal, the younger ones herbaceous, the older woody and purplish. Leaves lanceolate ovate or sublinear, of a yellowish green colour beneath, narrowed at both ends, subsessile or sessile, membranous, margins revolute, fasciculate by the presence of abbreviated axillary shoots; $\frac{1}{2}$–2 by $\frac{1}{8}$–$\frac{1}{2}$ in.; stipules short, truncate, tipped with 4 or 5 subulate puberulous setæ. Flowers about $\frac{1}{6}$ in. long, tetramerous, shortly pedicellate, in terminal usually trichotomous densely corymbose terminal cymes. Calyx coriaceous; tube puberulous, campanulate; lobes lanceolate-subulate, longer than the tube, at length recurving at the tip. Corolla funnel-shaped, shortly exceeding or nearly equalling the calyx, hairy inside. Filaments as long as the oblong half exserted anthers. Capsule subglobose, $\frac{1}{10}$ in. diameter, loculicidal above; seeds angular; valves at length cleft at the apex.—*Agathisanthemum Bojeri*, Klotzsch in Peters Mossamb. p. 294; *A. Petersii*, Klotzsch *l.c.* p. 295; *Hedyotis Bojeri*, Vatke in Oesterr. Bot. Zeitschrift xxv. p. 232 (1875).

Mozamb. Distr. Zanzibar, *Bojer! Kirk! Hildebrandt! Peters!*; Shupanga, *Kirk!*; Mozambique, *Forbes!*; Querimba, *Peters!*

South Central? South African Gold Fields, *Baines!*

Occurs also in Madagascar and the Comoros.

Very near the Natal *H. chlorophylla*, Hochst., from which it differs by usually rather smaller leaves and shorter internodes.

3. **O. globosa,** *Hiern.* Somewhat shrubby and branched at the base, puberulous above, of a yellowish colour. Branches erect, obtusely 4-sided, $1\frac{1}{2}$ feet high. Leaves elliptical, obtuse or mucronate, somewhat narrowed to a sessile base, often fasiculate by the presence of abbreviated axillary shoots, 1–2 by $\frac{1}{3}$–1 in.; stipules ovate tridentate, $\frac{1}{4}$ in. long. Flowers tetramerous, $\frac{1}{4}$ in. long, subsessile, crowded in solitary or ternate dense terminal globose heads $\frac{1}{2}$–1 in. diameter. Calyx coriaceous, puberulous; lobes lanceolate-subulate, elongating in fruit; occasionally some minute intermediate subulate teeth extra; tube short. Corolla funnel-shaped, rather exceeding the calyx; throat somewhat hairy. Anthers half exserted. Capsule subglobose but somewhat compressed, $\frac{1}{12}$–$\frac{1}{10}$ in. broad, furrowed down the broader sides, loculicidal at the apex. Seeds angular.—*Agathisanthemum globosum*, Klotzsch in Peters Mossamb. p. 294; *Hedyotis globosa*, Hochst. in Hb. Schimp. Abyss. ii. n. 512; A. Rich. Fl. Abyss. i. p. 360.

Nile Land. Abyssinia, *Schimper! Q. Dillon.*

4. **O. decumbens,** *Hiern.* Erect or decumbent, annual or perennial, glabrous in most parts, shining, smooth, $\frac{1}{2}$–3 feet long. Branches dichotomous, slender, herbaceous. Leaves lanceolate, acute, faintly nerved, subscabrous, wedge-shaped at the subsessile base; $\frac{3}{4}$–$1\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{2}$ in.; stipules very short and truncate or ovate, subciliate. Flowers tetramerous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, much exceeding the calyx, deep blue or lilac, pedicellate, in lax or divaricate mostly terminal cymes (a solitary flower often occurs in the forks of the branches). Calyx small; teeth lanceolate-subulate as long as the tube. Corolla salver-shaped; tube much exceeding the calyx, slender below, funnel-shaped above;

limb $\frac{1}{6}$ in. diameter; lobes ovate, subobtuse; throat thinly pubescent. Anthers subexserted. Fruit toughly coriaceous, subglobose, shining, $\frac{1}{12}$–$\frac{1}{8}$ in. diameter, subdidymous, at length bursting from the apex loculicidally. Seeds obtusely angular.—*Hedyotis* (Kohautia) *decumbens*, Hochst. in Flora 1844, p. 552; Sond. in Harv. and Sond. Fl. Cap. iii. p. 11; *H.* (*Kohautia ?*) *fugax*, Vatke in Oesterr. Bot. Zeitschrift xxv. p. 232 (1875); *Kohautia longiflora*, E. Mey. ex Sond. *l.c.*, non DC.

Upper Guinea. Cameroon Rivers, *Mann!* Niger (Lagos), *Barter!*
Lower Guinea. Congo, *Chr. Smith! Monteiro! Soyaux!*
Mozamb. Distr. Zanzibar Island and coast, *Hildebrandt!* (suffruticose); Kongone mouth of the Zambesi, also on the right bank of the Luabo, *Kirk!*
Occurs also in Natal and Madagascar (Ste. Marie, *Boivin*).

5. **O. lasiocarpa,** *Hiern.* Erect robust dichotomously branched annual, 2–2½ feet high, somewhat scabrous with short puberulence. Branches subterete. Leaves linear-lanceolate or lanceolate-oblong, obtuse or subacute, apiculate, attenuate at the sessile base; $\frac{2}{3}$–2½ by $\frac{1}{15}$–$\frac{1}{2}$ in., the uppermost ones smaller; stipules shortly sheathing, 2–3-cuspidate. Flowers tetramerous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, slender, 1–2 together, subsessile or shortly pedicellate, in pedunculate sessile terminal 2–3-chotomous cymes; branches of the inflorescence spicate in fruit. Calyx shortly pubescent in flower, $\frac{1}{10}$–$\frac{1}{8}$ in. long; lobes lanceolate-subulate, about as long as the tube. Corolla salver-shaped, glabrous, several times exceeding the calyx; lobes lanceolate-linear, rather obtuse (*fide* Klotzsch). Capsule depresso-globose, $\frac{1}{8}$ in. long, subdidymous, puberulous or nearly glabrate, crowned with the short lanceolate persistent calyx-teeth, at length bursting at the apex loculicidally. Seeds angular, imbedded in the corrugations of the placentas.—*Kohautia lasiocarpa*, Klotzsch in Peters Mossamb. p. 296.

Mozamb. Distr. Rios de Sena, *Peters!*; Shiramba, *Kirk!*

6. **O. rigida,** *Hiern.* Nearly glabrous, smooth, subglaucescent, rigid, branched, apparently perennial herb, more than a foot high. Branches rather divaricate, often fasciculate or verticillate, terete. Leaves few, linear, obtuse, $\frac{3}{4}$–1½ in. long; stipules sheathing, short, truncate, terminated by two short teeth, soon obliterated. Flowers $\frac{2}{5}$–$\frac{1}{2}$ in. long, slender, subsessile and pedicellate, in corymbose cymes, tetramerous. Corolla salver-shaped; tube many times the length of the calyx; limb $\frac{1}{4}$ in. diameter; lobes oblong, obtuse; throat glabrous. Capsule subglobose, $\frac{1}{8}$ in. diameter, at length bursting from the apex loculicidally. Seeds obtusely angular.—*Kohautia rigida*, Benth.! in Hook. Niger Fl. p. 402.

Lower Guinea. Elephant's Bay?, *Curror!*

7. **O. Schimperi,** *T. Anders. in Journ. Linn. Soc. Lond.* v. *Suppl.* i. p. 21. An ascending or decumbent rigid, glandular-scabrous perennial or annual, 1–3 feet high. Branches virgate, leafy at the base, sparingly so above, terete. Leaves linear (narrowly or broadly so),

sessile, $\frac{1}{3}$–$1\frac{1}{2}$ in. long; stipules 3–1-cuspidate. Flowers tetramerous, $\frac{2}{5}$–$\frac{1}{2}$ in. long, subsessile and pedicellate, in terminal corymbose cymes. Calyx-teeth lanceolate-subulate, about equalling the tube. Corolla salver-shaped; tube slender, several times the length of the calyx; limb small; lobes narrowly oval, subobtuse, $\frac{1}{6}$ in. long. Capsule subglobose, subdidymous, truncate and loculicidally splitting at the apex, base sub-turbinate. Seeds angular.—*Kohautia cæspitosa*, Schnizlein in Flora, xxv., Beibl. I. Nro. 10, p. 145 (1842), ex numero Kotsch.; *Kohautia Schimperi*, Steud. et Hochst. in Hb. Schimp. Arab. n. (186 and 358) 879 (1837); *Hedyotis Schimperi*, Presl in Drege Pl. Cap. Exsicc., and Bot. Bem. p. 85 (1844); *K. arabica*, Hochst. in Hb. Schimp. Arab. ex. Boiss. Fl. Or. iii. 12; *H.* (sp. ?), Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1216 (1847). Cfr. *O. retrorsa*, Boiss. Fl. Or. iii. 12.

Nile Land. Nubia, Soturba, *Schweinfurth!*; Chartum, *Schweinfurth!*; Abyssinia, *Hildebrandt!*; Nubia, *Kotschy!* Hor Tamanib, Red Sea, *Lord!*; between Suakin and Berber, *Schweinfurth!*

Occurs also in Upper Egypt, Arabia, Sinai, Beloochistan and Scinde.

8. **O. obtusiloba,** *Hiern.* Branched from the base, about a foot high, nearly glabrous. Branches quadrangular, dichotomous, subscabrous below. Leaves linear, pointed, sessile, 1–$1\frac{1}{2}$ in. long, the uppermost ones smaller; margins revolute; stipules shortly connecting the leaf-bases, cuspidate or the upper ones bi-cuspidate, the cusp when solitary bifid. Flowers tetramerous, apparently purple, $\frac{1}{6}$–$\frac{2}{3}$ in. long, pedicellate, in trichotomous few flowered cymes; pedicels $\frac{1}{6}$–$\frac{4}{5}$ in. long. Calyx $\frac{1}{8}$–$\frac{1}{5}$ in. long, glabrous; lobes lanceolate, subobtuse, longer than the tube. Corolla-lobes oval, obtuse, $\frac{1}{3}$ by $\frac{1}{8}$ in.; tube funnel-shaped towards the apex. Stamens and style included. Capsule depresso-globose, somewhat compressed, $\frac{1}{8}$ in. long, pallid, dehiscing loculicidally.

Mozamb. Distr. Zanguebar, Kingani, *Kirk!*; Mozambique, *Forbes!*

Can this species be *O. Zanguebariæ*, Lour. Fl. Cochinch p. 78, n. 3 (1790); *Hedyotis Zanguebariæ*, Roem. and Schult. Syst. Veg. iii. p. 192, n. 10?

9. **O. senegalensis,** *Hiern.* Erect annual, 1–3 feet high, branched from the base, slightly scabrous by minute tubercles on the stem, branches, leaves and flowers. Leaves narrowly lanceolate, acute, tapering to a sessile clasping base; the longer ones 2–3 by $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules bicuspidate or shortly setose from a truncate apex. Flowers tetramerous, slender, $\frac{2}{5}$–$\frac{1}{2}$ in. long, white or purple, subsessile or pedicellate on the branches of a paniculate cyme. Calyx $\frac{1}{12}$–$\frac{1}{8}$ in. long in flower; teeth narrow, acute, about equalling the tube. Corolla salver-shaped; tube slender, funnel-shaped at the top, several times the length of the calyx; throat glabrous; lobes $\frac{1}{6}$–$\frac{1}{4}$ in. long, linear-lanceolate, acuminate-apiculate. Anthers included, linear. Fruit subglobose, $\frac{1}{8}$ in. diameter, somewhat didymous, crowned by the subulate calyx-lobes, at length bursting loculicidally from the apex. Seeds angular.—*Kohautia senegalensis*, Cham. et Schlecht. in Linnaea iv. p. 156 (1829); Endl. Atakta Bot. t. 23 (1833); *Knoxia senegalensis*, Reichenb.! in Sieb.

Hb. Seneg. n. 9. Cfr. *Kohautia stricta*, DC. Prodr. iv. p. 430, excl. syn.

Upper Guinea. Senegambia, *Sieber; Roger!; Leprieur and Perrottet!; Park!;* Niger, Nupe, *Barter!*

Nile Land. Cordofan, *Kotschy!; Schimper;* Gallabat, *Schweinfurth!;* Soturba, *Schweinfurth!;* Sennaar, *Kotschy!*

10. **O. noctiflora,** *Hiern.* Erect slender lucid nearly glabrous and smooth annual, 1–1½ feet high, unbranched below the inflorescence. Stem terete below, obtusely quadrangular and sulcate above. Leaves linear, the upper ones narrowly so, acute, narrowed towards the sessile base, 1–2 in. long; stipules short, truncate, bicuspidate. Flowers tetramerous, white, $\frac{2}{5}$–$\frac{1}{2}$ in. long, opening in the evening and by night; pedicels some very short, others ranging up to $\frac{1}{2}$ in., arranged in a lax oblong 2–3-chotomous somewhat leafy cyme. Calyx $\frac{1}{7}$–$\frac{1}{5}$ in. long; lobes lanceolate, acute, longer than the tube. Corolla-tube rather slender; lobes $\frac{1}{3}$ in. long by $\frac{1}{10}$ in. broad, elliptic-lanceolate, acuminate. Capsule not seen.—*Kohautia noctiflora*, Hochst. in Hb. Schimp. Abyss. ii. n. 827; *Hedyotis grandiflora*, A. Rich. Fl. Abyss. i. p. 363, excl. syn. DC.

Nile Land. Abyssinia, near Selasquilla, *Schimper!;* in sterile places, 5000 feet alt. *Schimper!*

11. **O. grandiflora,** *Hiern.* Erect annual, 1–4 feet high, branched from the base throughout, glabrous smooth or slightly scabrous. Leaves narrowly lanceolate or the upper ones almost needle-shaped, taper-pointed, narrowed to the sessile base; the longer ones 1½–3 by $\frac{1}{12}$–$\frac{1}{4}$ in.; stipules short, sheathing, truncate, 2–3-cuspidate. Flowers tetramerous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, subsessile or pedicellate, red, numerous, in a corymbose cyme; branches closely umbellate at the top. Calyx $\frac{1}{10}$–$\frac{1}{6}$ in. long; lobes lanceolate-subulate, acute, about as long as the ovary, more or less. Corolla salver-shaped; tube slender, sometimes curved; throat glabrous; limb $\frac{1}{2}$–$\frac{2}{3}$ in. diameter; lobes oval, finely apiculate-acuminate, $\frac{1}{4}$–$\frac{1}{3}$ in. long by $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Anthers included. Fruit subglobose, $\frac{1}{8}$ in. diameter or rather more, crowned by the persistent calyx-teeth, at length bursting loculicidally at the apex. Seeds angular.—*Kohautia grandiflora*, DC. Prodr. iv. p. 430; *Hedyotis* (Kohautia) *Quartiniana*, A. Rich. Fl. Abyss. i. p. 362.

Upper Guinea. Senegambia, *Bacle, Perrottet and Leprieur! Dr. Skues! Roger! Bidjem! Ingram! Whitfield!* Niger, *Barter!;* Sierra Leone, *Purdie!*

Nile Land. Fayohel, *Kotschy!* Gallabat, *Schweinfurth!* Abyssinia, not far from the city of Gondar, *Quartin Dillon.*

12. **O. abyssinica,** *Hiern.* Erect or ascending annual, ¼–1 ft. high, simple or branched, slightly scabrous. Leaves linear or lanceolate, acute, narrowed at the sessile base, ½–1 by $\frac{1}{16}$–¼ in.; stipules sheathing, 1–5 setose. Flowers tetramerous, red, ¼ in. long, mostly subsessile on simple or usually branched terminal spikes. Calyx $\frac{1}{8}$–$\frac{1}{7}$ in. long; teeth linear-subulate, $\frac{1}{10}$–$\frac{1}{6}$ in. long. Corolla shortly salver-shaped; tube little exceeding or scarcely twice the length of the calyx-teeth; lobes $\frac{1}{10}$–$\frac{1}{8}$ in. long, oval, obtusely pointed; throat

glabrous, anthers included. Fruit campanulate-globose, $\frac{1}{8}$ in diam., at length bursting loculicidally at the apex. Seeds angular.—*Hedyotis* (Kohautia) *abyssinica*, Hochst. in Hb. Schimp. Abyss. iii. n. 1902; A. Rich. Fl. Abyss. i. 363; *H. senegalensis*, A. Rich Fl. Abyss. i. p. 362, quoad specim. Schimp., excl. syn.

Upper Guinea. Senegambia, *Bijem!*
Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit! Parkyns! Pearce!*

13. **O. strumosa,** *Hiern.* Erect annual, $\frac{1}{2}$–$1\frac{1}{2}$ feet high, branched from the base, slightly scabrous by minute tubercles on the stem, branches, leaves, and calyx. Stem and branches leafy from the base upwards. Leaves linear-lanceolate, acute, narrowing to a sessile clasping base, the larger ones $1\frac{1}{4}$–2 by $\frac{1}{8}$–$\frac{1}{5}$ in.; stipules sheathing, truncate or ovate, setose. Flowers tetramerous, slender, $\frac{1}{4}$ in. long, mostly subsessile, 1–2 together, on the subsecund branches of a wide corymbose terminal cyme. Calyx in flower $\frac{1}{12}$–$\frac{1}{10}$ in. long; lobes lanceolate, short, acute. Corolla salver-shaped; tube slender, funnel-shaped in the upper part, many times the length of the calyx-limb; lobes short, obtuse. Anthers included. Fruit subglobose, $\frac{1}{8}$ in. diam. or rather more, somewhat didymous, crowned by the subulate calyx-lobes, at length bursting loculicidally at the apex. Seeds angular.—*Hedyotis* (Kohautia) *strumosa*, Hochst. in Hb. Schimp. Abyss. iii. n. 1867 (1844); *Kohautia strumosa*, Hochst. in Hb. Kotsch. Nubic. n. 46 (1841); Rich. Fl. Abyss. i. 364.

Nile Land. Sennaar, *Kotschy!*; Abyssinia, *Schimper!* Cordofan, *Kotschy!*
Occurs also in the Cape de Verde Islands. It seems, moreover, to be the same as, or very closely allied to, the East Indian species *H. aspera*, Heyne.

14. **O. Caffra,** *Eckl. et Zeyh. Enum. Pl. Afr. Austr. Extratrop.* 1360. n. 2291 (Jun. 1836). An erect or ascending annual or perennial, somewhat shrubby at base, 6–30 in. high, branched from the base, obsoletely scabrous. Leaves more or less lanceolate, acute, with recurving mucro, sessile, rather paler beneath, the margins recurved, the longer ones $\frac{2}{3}$–3 by $\frac{1}{16}$–$\frac{1}{3}$ in.; stipules truncate, each tipped with about 4–6 long ($\frac{1}{8}$–$\frac{1}{4}$ in.) usually spreading or recurved setæ. Flowers tetramerous, white pink or bluish, $\frac{1}{4}$–$\frac{1}{3}$ in. long, 3–1 together, on unequal pedicels, in 2–3-chotomous terminal corymbose cymes; pedicels ranging up to $\frac{1}{2}$ in., or in some forms not so long. Calyx glabrous or pubescent $\frac{1}{10}$–$\frac{1}{6}$ in. long; lobes lanceolate acute longer than the tube. Corolla tubular 2–3 times the length of the calyx; limb $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; throat glabrous; lobes oval-ovate, obtuse. Fruit subglobose, $\frac{1}{8}$ in. diam., subdidymous, tipped by the long subulate calyx-teeth. Seeds angular.—*Hedyotis Caffra*, Steud. Nomencl. Bot. ed. 2, i. p. 726; *Kohautia setifera*, DC. Prodr. iv. p. 430; *Hedyotis setifera*, Sond. in Harv. et Sond. Fl. Cap. iii. 10; *H. Gerrardi*, Sond. l.c. 9; *K. macrophylla*, Klotzsch in Peters Mossamb. p. 297.

Lower Guinea. Angola, Ambriz, *Monteiro!* Congo, *Chr. Smith!*
Mozamb. Distr. Zanzibar coast, Moumfia, *Sir B. Frere! Hildebrandt!* Shupanga, Moramballa, *Kirk!* Cabaceira and Sena, *Peters!* Zambesia, *Stewart!*
Occurs also in the Cape Flora and Natal, and perhaps also in Madagascar.

15. **O. virgata,** *DC. ? Prodr.* iv. p. 425. Erect or ascending perennial, with numerous virgate slender branches, glabrous above, puberulous or glabrate beneath, ranging from 2 in. to 2 ft. high. Leaves narrowly or sometimes broadly linear, acute, apiculate, sessile, $\frac{1}{2}$–$1\frac{2}{3}$ in. long; margins revolute; stipules short, sheathing, truncate, with 2–3 rather long erect setæ at the apex. Flowers tetramerous, $\frac{1}{5}$–$\frac{1}{4}$ in. long, 2–1 together or fasciculate, on pedicels short or exceeding the calyx ranging up to $\frac{3}{8}$ in., in an ample terminal corymbose panicle. Calyx-teeth lanceolate-subulate, glabrous or nearly so, short. Corolla slender, cylindrical or salver-shaped, 2–3 times as long as the calyx; limb small; throat glabrous. Fruit subglobose, $\frac{1}{12}$–$\frac{1}{8}$ in. diam., subdidymous, at length bursting at the apex loculicidally. Seeds angular. —? *Hedyotis virgata,* Willd. Sp. Pl. i. p. 567 (1797); *Kohautia parviflora,* Benth. in Hook. Niger Fl. p. 403 *part.*

Upper Guinea. Guinea, *teste* Willd., *Thonning;* Sierra Leone, *Smeathman! Afzelius! Purdie!;* Accra, *G. Don!*

Nile Land. Abyssinia, *Schimper!* Djurland, *Schweinfurth!*

Mozamb. Distr. Between Lupata and Tette, *Kirk!*

Kohautia longifolia, Klotzsch in Peters Mossam. Bot., p. 297, appears to belong to this or perhaps to the previous species; the specimens were collected at Sena and in the island of Mozambique.

16. **O. effusa,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 84, t. 48 (1873). Somewhat decumbent, 2–3 ft high, smooth or nearly so; branches slender, terete. Leaves narrowly linear-lanceolate, acute, 1–2 (–3) in. long, sessile, margins revolute; stipules setose. Flowers tetramerous, slender, $\frac{1}{4}$–$\frac{1}{3}$ in. long, delicate, lilac, in ample effuse paniculate cymes; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Calyx $\frac{1}{8}$ in. long, nearly glabrous, teeth lanceolate-subulate, rather longer than the ovary, anthers and style included. Corolla salver-shaped; throat glabrous; lobes ovate, subobtuse. Fruit globose, $\frac{1}{8}$ in. diam. or rather more, at length bursting loculicidally at the apex. Seeds angular.—*Hedyotis,* sp. n. 4, T. Thoms. in Speke, Journ., App. p. 636; *Kohautia,* sp. n., Benth. in Hook. Niger Fl. p. 403.

Upper Guinea. Senegambia, *Heudelot!*

South Central. Lake Tanganyika, *Cameron!*

Mozamb. Distr. M'geta, 7° 20′ S. lat., *Speke and Grant!*

17. **O. Heynei,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 84. Erect or decumbent annual or biennial, 1–2 ft. long or more, with numerous often elongated tetragonal branches, somewhat scabrous or smooth. Leaves linear-lanceolate or narrower, acute, somewhat narrowed at the sessile base, the longer ones 1–3 by $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules very shortly setose. Flowers tetramerous, $\frac{1}{6}$–$\frac{1}{5}$ in. long, lower solitary, axillary, terminal ones usually forming a paniculate cyme; peduncles mostly half to three-quarters the length of the leaves, some exceeding them. Calyx half as long as the slender corolla-tube; lobes lanceolate, as long as the tube. Corolla salver-shaped; throat glabrous; limb small. Fruit subglobose, glabrous, at length bursting at the top loculicidally. Seeds minute, angular.—*Hedyotis stricta,* J. E. Smith! in Rees Cycl. xvii. n. 21, non Wall. nec Sonder; *Hedyotis Heynei,* Br.

in Wall. List n. 867; Wight and Arn. Prodr. p. 416; *H. dichotoma*, A. Rich. Fl. Abyss. i. p. 361; *H.* (Kohautia) *micrantha*, Hochst. in Hb. Schimp. Abyss. (1854) ed. Hohenack. n. 2263; ? *O. linearis*, DC. Prodr. iv. p. 425.

Upper Guinea. Sierra Leone, *Afzelius!*; Accra, *G. Don!*; ? Senegambia, *Perrottet and Leprieur*; Niger, *Barter!*

Nile Land. Karague, *Speke and Grant!* 447; Djurland, *Schweinfurth!*; Abyssinia, *Schimper!*

Occurs also in India and Natal, and apparently also in Madagascar.

18. **O. parviflora,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 84; *excl. syn.* (1873). Much branched nearly glabrous herb, shortly decumbent at base, with long tapering vertical root. Lower branches subterete, upper subangular. Leaves narrowly linear, acute, rather thick, scabrous on the margins, sessile, $\frac{1}{3}$–$1\frac{1}{3}$ in. long; stipules 2–4-setose. Flowers tetramerous, $\frac{1}{6}$ in. long, on short pedicels as long as the calyx or shorter, 2–9 together, subfasciculate in small umbellate corymbs arranged in an ample somewhat leafy corymbose cyme. Calyx half the length of the flower; teeth lanceolate-subulate. Corolla funnel-shaped, half cleft; throat somewhat hairy inside; tube slightly exceeding the calyx; lobes oblong-ovate, subobtuse. Anthers included. Style exserted. Capsule subglobose, truncate, crowned by the calyx-teeth, $\frac{1}{12}$ in. diam., subdidymous, at length dehiscing loculicidally at the top. Seeds angular.—*Kohautia parviflora*, Benth. in Hook. Niger Fl. p. 403 (1849), *part.*—*Hedyotis*, sp. n. 3, T. Thoms. in Speke, Journ., App. p. 636.

Upper Guinea. Niger, *Th. Vogel!*

Nile Land. A common weed about the fields of Kazeh, at alt. 4000 ft. S. lat. 5°, E. long. 33°, *Speke and Grant!*

19. **O. flosculosa,** *Hiern.* A profusely branched nearly glabrous annual, 6–12 in. high. Leaves linear-oval, narrowed at both ends, mostly apiculate, subsessile, glabrous, paler beneath, spreading, margins revolute; $\frac{3}{8}$–$1\frac{1}{8}$ by $\frac{1}{20}$–$\frac{1}{4}$ in.; stipules subulate or paucisetose. Flowers about $\frac{1}{10}$ in. long, tetramerous, on pedicels about equalling the calyx, several together in little clusters on branched spicate racemes, forming an ample terminal cyme. Calyx glabrous, subhemispherical, with short narrowly lanceolate teeth. Corolla subcampanulate somewhat exceeding the calyx-teeth; throat glabrous. Capsule subglobose, dehiscing loculicidally at the apex, about $\frac{1}{12}$ in. diam. Seeds angular.

Mozamb. Distr. Zanzibar Island, *Hildebrandt!*

20. **O. monanthos,** *Hiern.* Rootstock woody. Stems cæspitose, slender, prostrate, glabrous or nearly so, short or elongated. Leaves oval, obtuse or subacute, somewhat narrowed at the base, very shortly petiolate, with a few scattered short inconspicuous hairs especially on the margin, 1-nerved and rather paler below; $\frac{1}{5}$–$\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{5}$ in.; stipules shortly sheathing 3–1-setose or truncate. Flowers tetramerous, white, $\frac{1}{4}$–$\frac{3}{8}$ in. long, solitary, axillary, on peduncles from half to the whole of the length of the leaves. Calyx $\frac{1}{8}$–$\frac{1}{4}$ in. long; lobes lanceolate, obtuse,

shortly ciliate, as long as the somewhat turbinate ovary. Corolla half cleft; tube about equalling the calyx-teeth; limb funnel-shaped, hairy at the throat, lobes oval, obtuse, puberulous inside. Style exserted, with two short spreading branches. Capsule subglobose, crowned with the erect calycine lobes, loculicidally bi-valved.—*Hedyotis monanthos*, Hochst. in Hb. Schimp. Abyss. ii. n. 1370; Rich. Fl. Abyss. i. 359.

Nile Land. Abyssinia, *Schimper!*; alt. 8400 ft., *Petit*.

21. **O. cæspitosa,** *Hiern.* A cæspitosely branched dwarf procumbent leafy annual, puberulous towards the extremities. Leaves linear-oval or oblong, obtuse, somewhat narrowed to the sessile base, $\frac{1}{6}$—$\frac{1}{3}$ in. long; stipules sheathing, membranous, truncate, setose-ciliate. Flowers very small, tetramerous, white, pedunculate, solitary; peduncles slender, about $\frac{1}{6}$ in. long, from the upper axils. Calyx-segments lanceolate, acute, and as long as the tube in flower, in fruit ovate. Corolla funnel-shaped, shortly exceeding the calyx. Capsule subglobose, slightly compressed, about $\frac{1}{15}$ in. diam., dehiscing loculicidally at the apex. Seeds obtusely angular.—*Oldenlandia herbacea ?* var. *cæspitosa*, Benth. in Hook. Niger Fl. p. 403.

Upper Guinea. Cape Palmas, *Th. Vogel!*

22. **O. tenuissima,** *Hiern.* A densely cæspitose very slender annual, about an inch high, simple or but little branched dichotomously. Stem sparingly puberulous. Leaves linear or subspathulate or the uppermost and lower ones narrowly oval, obtuse, somewhat narrowed towards the sessile base, sparingly scabrous, $\frac{1}{6}$—$\frac{1}{3}$ in. long or those towards either extremity smaller; margins recurving; stipules shortly sheathing, ovate, apiculate or bidentate, not spinose. Flowers solitary, subterminal and in the upper axils, pedunculate, very small, tetramerous; peduncles slender, scarcely glabrous, ranging up to $\frac{1}{4}$ in. Calyx somewhat turbinate, not quite glabrous; segments lanceolate-subulate, as long as the tube. Corolla funnel-shaped, about the length of the calyx-teeth; lobes ovate, subobtuse. Stamens included; anthers short. Capsule subglobose, slightly compressed, furrowed down the broader sides, dehiscing loculicidally at the apex, membranous, $\frac{1}{15}$ in. diam.; base somewhat turbinate. Seeds obtusely angular.

South Central. Island at Victoria Falls, *Kirk!*

23. **O. lancifolia,** *Schweinf. mss. in Hb.* Herbaceous annual, simple or branched near the base. Stem or branches elongated, slender, glabrous, smooth or slightly scabrid, creeping or prostrate. Leaves linear or narrowly lanceolate, narrowed at both ends, glabrous, 1–2 in. long, sessile; margins rather scabrid; stipules shortly sheathing, truncate or apiculate, bicuspidate with subulate or filiform diverging or distant teeth. Flowers very small, solitary, on long slender axillary alternate and opposite pedicels of $\frac{1}{3}$—$\frac{2}{3}$ in., divaricate in fruit. Calyx-lobes 4, lanceolate, acute, as long as the tube. Corolla shorter than or scarcely exceeding the calyx, campanulate. Capsule globose, somewhat compressed, marked with a furrow down each of the broader sides, $\frac{1}{8}$–$\frac{1}{6}$ in.

diam., crowned with the persistent calyx-teeth, loculicidally dehiscing from the apex. Seeds minute, angular.—*Hedyotis lancifolia*, Schum. Beskr. Guin. Pl. p. 72; *Hedyotis*, No. 2, Thoms. in Speke Journ., App. p. 636; *Oldenlandia* (sp.), Oliv. in Trans. Linn. Soc. Lond. xxix. p. 84.

Upper Guinea. Guinea, moist places in the valley of Aquapim, *Schumacher;* Niger Expedition, at Aboh and Nupe, in moist places, *Barter!* By the Bagroo River, *Mann!*

North Central. Monbuttu Land, *Schweinfurth!*

Nile Land. Bogs at Madi, *Speke and Grant!*

24. **O. corymbosa,** *Linn. Sp. Pl.* edit. i. p. 119 (1753). An erect ascending or diffuse annual, smooth and glabrous or nearly so, branched, ranging up to a foot in height. Branches tetragonal, usually smooth. Leaves linear or nearly so, acute or apiculate, narrowed to the sessile base, usually glaucous or paler beneath, the longer ones $\frac{2}{3}$–$1\frac{1}{2}$ in. or in some forms rather larger; stipules truncate, shortly sheathing, sub–3-setose. Flowers tetramerous, white, $\frac{1}{10}$ in. long, 2–5 together in axillary and terminal umbellate corymbs usually rather shorter than the leaves or rarely solitary; pedicels $\frac{1}{12}$–$\frac{1}{4}$ in. long; peduncles ranging up to $\frac{1}{2}$ in. Calyx about equalling the corolla-tube; teeth lanceolate, as long as the tube. Corolla campanulate or subrotate; throat pubescent or nearly glabrous; anthers included or subexserted. Fruit subglobose, $\frac{1}{10}$ in. diam., subdidymous, crowned by the calyx-limb, at length bursting loculicidally at the apex. Seeds angular. —*Hedyotis corymbosa*, Vatke in Oesterr. Bot. Zeitschr. xxv. p. 232; *O. herbacea*, DC. Prodr. iv. p. 425; (*? H. herbacea* L.), *H. (Kohautia ?) pusilla*, Hochst. in Hb. Schimp. Abyss. iii. n. 1522; A. Rich. Fl. Abyss. i. 362; *? H. sperguloides* and *H. trichopoda*, A. Rich. *l. c.* p. 361, 360; *? H. longifolia*, Schum. and Thonn. Beskr. Guin. Pl. p. 70, n. 2, i.e. *O. longifolia*, DC. Prodr. iv. p. 426; *Oldenlandia*, sp. Unio Itin. in Hb. Schimp. i. n. 68 (1840).

Upper Guinea. Senegambia; Accra, *G. Don!* by the Quorra, *Th. Vogel!* Fernando Po, *Milne! Th. Vogel!* St. Thomas, *G. Don!*

Nile Land. Abyssinia, *Schimper!* Djurland, *Schweinfurth!* Bongo-land, *Schweinfurth!*

Lower Guinea. Congo, *Burton!, Chr. Smith!*

Mozamb. Distr. R. Sena, in sandy places, *Peters;* between Tette and the sea coast, at Marraro, 27th March, 1860, *Kirk!;* ? Kongone mouth of the Zambesi, *Kirk!;* ? Zanzibar Island, *Hildebrandt* n. 1008 ex Vatke in Oesterr. Bot. Zeitsch. xxv. p. 232 (1875), under name of *Hedyotis* (Oldenlandia) *herbacea*, Blume.

A common tropical weed.

25. **O. capensis,** *Linn. fil. Suppl. Pl.* 127 (1781). A puberulous or somewhat scabrous much branched decumbent or diffuse leafy annual, 4–9 in. high or more. Branches tetragonal, spreading in all directions. Leaves narrowly linear, acute, sessile, $\frac{1}{2}$–1 in. long; margins more or less revolute; stipules truncate or shortly ovate, sheathing, 2–3-setose. Flowers tetramerous, $\frac{1}{12}$–$\frac{1}{10}$ in. long. Peduncles numerous, rarely only 2 together, axillary and terminal, clustered,

1-flowered, much shorter than the leaves, about the length of the calyx. Calyx sub-coriaceous; teeth lanceolate, hispid-scabrous on the margin, distant. Corolla white, scarcely or rather exceeding the calyx, funnel-shaped, deciduous; throat somewhat hairy; lobes obtuse. Stamens and style included. Capsule subglobose, 4-ribbed, $\frac{1}{10}$ in. diameter, at length loculicidally bursting at apex. Seeds angular. *Hedyotis capensis*, Lam. Ill. i. p. 271, n. 1425 (1791). *H. sabulosa* and *H. riparia*, DC. Prodr. iv. p. 424 (*O. riparia*, Steud. Nomencl. ed. 2, i. 728), appear to belong to this species; I have not seen specimens.

Upper Guinea. Niger, *Barter!*; Senegambia, *Perrottet and Leprieur*, *Lelierre*.
Nile Land. Djur-land, *Schweinfurth!*; Cordofan, *Cienkowsky*.
Mozamb. Distr. Zambesia, *Stewart!*; Mozambique, *Forbes!*; Sena, *Peters!*; Cabaceira, *Peters*.

Occurs also in the Cape Flora, in Madagascar, and in Syria according to Boissier, Fl. Or. iii. 11. According to Sonder in Harv. et Sond. Fl. Cap. iii. 9, the calyx is sometimes 5-fid.

26. **O. trinervia,** *Retz. Obs. Bot.* iv. p. 23 (1786). Colour yellowish green. Stems herbaceous, decumbent, elongated, angular, more or less branched dichotomously, rooting at base, hirsute or nearly glabrous, $\frac{1}{2}$–$1\frac{1}{2}$ ft. long. Leaves elliptical ovate or obovate, obtuse or apiculate, wedge-shaped at base, shortly petiolate, usually rather glossy, $\frac{1}{4}$–$\frac{4}{5}$ by $\frac{1}{8}$–$\frac{1}{3}$ in., indistinctly 3-nerved at base; margins narrowly revolute, scabrid; stipules ovate, bicuspidate. Flowers tetramerous, $\frac{1}{12}$–$\frac{1}{10}$ in. long, very shortly pedicellate, axillary and terminal, crowded several (6 or fewer) together in each of opposite axils. Calyx sub-coriaceous, hirsute with spreading hairs; teeth lanceolate, distant. Corolla scarcely exceeding the calyx, rotate, glabrous within. Capsule hirsute, globose, at length bursting loculicidally. Seeds small, obtusely angular.—*Hedyotis trinervia*, Roem. et Schult. Syst. Veg. iii. p. 197, n. 27; Wight et Arn. Prod. p. 414, cum syn. plur. *H. goreensis*, DC. Prodr. iv. p. 421.

Upper Guinea. Niger at Nupe, *Barter!* Senegambia, *Leprieur and Perrottet*; a weed in rice-fields.
Nile Land. Djur-land, *Schweinfurth!*
Mozamb. Distr. Zanzibar Island, *Hildebrandt!*

Occurs also in India, Madagascar, Mauritius, &c.

De Candolle l.c. describes a variety *β. erecta* (stem erect simple much shorter, head terminal umbellate) also from Goree, and gathered by Leprieur and Perrottet.

Wight and Arnott l.c. quote as a synonym *O. repens*, Burm. Ind. p. 38, t. 15, f. 2 (bad). This bears date 1768, but Burmann describes and figures the peduncles as solitary and 1-flowered.

27. **O. macrophylla,** *DC. Prodr.* iv. p. 427. Aquatic or palustral, creeping decumbent or diffuse, annual or sometimes perhaps perennial. Stem somewhat quadrangular, $\frac{1}{2}$–2 ft. long or more. Leaves sessile or subsessile, lanceolate or linear- or ovate-lanceolate, mostly acute, 1–3 by $\frac{1}{6}$–1 in., more or less narrowed at base; stipules broad at the base, entire or 2–3-toothed. Cymes 2–6 in. long, including the peduncles, lax, dichotomous axillary and terminal, paniculate or racemose; pedicels ranging up to $\frac{1}{2}$ in., spreading or deflexed in fruit.

Flowers ¼ in. long, pentamerous. Calyx-tube turbinate in flower, campanulate or hemispherical in fruit; teeth small. Corolla ⅙ in., white or pale blue. Capsule about ⅛ in. diameter, membranous, subdidymous, dehiscing loculicidally at the apex. Seeds angular, very small.—*Hedyotis pentandra*, Schum. et Thonn. Pl. Guin. 71. *H. pentamera*, Hochst. in Flora 1844, 552. *Hedyotis macrophylla*, Lepr. et Perr. ex DC. l.c. *Pentas? Thonningii*, Walp. Repert. vi. p. 58, *O. pentandra*, DC. Prodr. iv. p. 427, non Retz. *O. laxiflora*, Benth. in Hook. Niger Fl. 404. *Pentodon decumbens*, Hochst. in Flora 1844, p. 552. *P. abyssinicus*, Hochst. l.c. *P. pentandrus*, Vatke in Oesterr. Bot. Zeitschrift xxv. 231 (1875). *Pentas*? (sp.) Benth. in Hook. Niger Fl. 402.

Upper Guinea. Gambia, *Leprieur and Perrottet;* Guinea, *Thonning;* Nun River, *Th. Vogel!* Niger, *Barter!* Abbeokuta, *Barter!* Corsico Island, *Mann!* Sierra Leone, *Afzelius!*

Nile Land. Abyssinia, *Schimper!* White Nile, *Petherick!* Niamniam-land, *Schweinfurth!* Sennaar, *Cienkowsky!*

Lower Guinea. Congo, *Chr. Smith!* Loango, *Soyaux!*

Mozamb. Distr. Kongone Mouth of Zambesi, *Kirk! Stewart!* Shupanga, *Kirk!* Zanzibar, *Hildebrandt!* Sena, *Peters.*

Occurs also in Natal, and the Seychelles Islands, and Johanna.

28. **O. wauensis,** *Schweinf. mss. in Hb. sub Hedyotide.* Nearly glabrous, toughly herbaceous, about a foot high, branched. Root fibrous, apparently annual. Branches marked with 4 raised lines. Leaves linear or nearly so, usually apiculate, narrowed towards sessile base, ½–1 by $\frac{1}{16}$–⅛ in.; stipules sheathing, multisetose at truncate apex. Flowers pentamerous or occasionally tetramerous, usually in pairs, subsessile, axillary and terminal, scarcely ¼ in. long. Calyx-lobes lanceolate, apiculate or at length obtuse, $\frac{1}{12}$–⅙ in. long. Corolla scarcely exceeding the calyx. Capsule obconic-oblong, coriaceous, about ¼ in. long, indehiscent or tardily dehiscent (loculicidal at the apex). Seeds small, obtusely angular.

Nile Land. Djurland, sandy fields above the Wau River, *Schweinfurth!*

29. **O. hedyotoides,** *Boiss. Fl. Orient.* iii. p. 11 (1875). A profusely branched nearly glabrous herb, ½–1 ft. high. Branches angular, often rooting at the base. Leaves linear-oval, narrowed at both ends, subsessile, ⅓–1 by $\frac{1}{16}$–⅛ in., stipules pluri-setose, shortly sheathing. Flowers tetramerous, $\frac{1}{12}$ in. long, very shortly pedunculate, clustered a few together in the axils of the leaves. Calyx with 4 lanceolate-subulate lobes and as many (or sometimes fewer) intervening narrow subulate teeth nearly as long. Corolla hardly exceeding the calyx, 4-fid, glabrous inside, white. Stamens and style included. Capsule coriaceous, subglobose, truncate, 4-ribbed, indehiscent. Seeds small, obtusely angular.—*Karamyschewia hedyotoides*, Fisch. and Mey. in Bull. Soc. Mosc. 1838, p. 267. *Theyodis octodon*, A. Rich. Fl. Abyss. i. p. 364. *Hedyotis* (sp.), Benth. et Hook. f. Gen. Pl. ii. p. 59. *O. ramosissima*, Hohen. in Hb. Lenkoran. Unio Itin. 1838, non Fischer.

Nile Land. Abyssinia, *Q. Dillon!* Nubia, *Ehrenberg!* Sennaar, *Kotschy!*

Cienkowsky! Cordofan, *Kotschy!* Niamniam-land, *Schweinfurth!* Djur-land, *Schweinfurth!*

Occurs also, according to Boissier, Fl. Or. iii. 11, in Upper Egypt, Lenkoran, etc.

EXCLUDED AND DOUBTFUL SPECIES.

Oldenlandia pentandra, Retz. Fasc. Obs. Bot. iv. p. 22, n. 64 (1786); Schum. et Thonn. Beskr. Guin. Pl. p. 83, is *Vahlia Oldenlandiæ*, DC.

Oldenlandia umbellata, Linn. is given by De Candolle, Prod. iv. p. 426, as perhaps a native of Joel in Senegambia from a specimen gathered by Perrottet; it is also given as from the district of the Gaboon River by Edélestan Jardin, Herb. Cot. Occ. Afr. p. 3.

Oldenlandia biflora and *O. stricta* are also given by E. Jardin from the Gaboon.

14. HEKISTOCARPA, Hook. f. in Benth. et Hook. f. Gen. Plant. ii. 62.

Calyx-tube campanulate-oblong; teeth 5 ovate small persistent. Corolla funnel-shaped, glabrous inside except the pilose throat; limb rather small, 5-lobed; lobes widely ovate, obtuse, reduplicate-valvate in bud. Stamens 5, inserted below the throat of the corolla; anthers oblong, sessile, obtuse. Disk shallow. Ovary 2-celled; style slender, terminated by 2 spathulate spreading branches; ovules numerous, in one row in each cell, ascending. Fruit small, crustaceous, oblong, obtuse at both ends, somewhat compressed transversely to the septum, few-seeded, "septicidally separable into 2 tardily dehiscent cocci."—A wiry, somewhat strigose herb, with elongated terete patent branches, lanceolate stipules, opposite membranous leaves, and axillary inflorescence with small secund flowers and minute setaceous bracteoles.

A monotypic genus.

1. **H. minutiflora,** *Hook. f. Ic. Pl.* t. 1151. 4–5 ft. high. Stipules $\frac{1}{4}$–$\frac{3}{8}$ in. long, at length reflexed, ciliate with a few long hairs. Leaves elliptical or obovate, acuminate at both ends, shortly petiolate, with scattered hairs on both surfaces and on the margin; 3–6 by 1–2 in. Flowers $\frac{1}{6}$ in. long, sessile on the secund spicate branches of dichotomous axillary inflorescences, which attain to about half the length of the leaves. Fruit $\frac{1}{10}$–$\frac{1}{8}$ in. long.

Upper Guinea. Old Calabar River, *Mann!*

15. MUSSÆNDA, L.; Benth. et Hook. f. Gen. Plant. ii. 64.

Calyx oblong turbinate or ovoid; limb 5-lobed, lobes usually linear or subulate, in some species short rounded or elliptical, persistent or deciduous, green or coloured, subequal or in most species one lobe in certain flowers produced into a stalked, coloured, large, dilated lamina. Corolla-tube cylindrical or narrowly funnel-shaped; limb 5-lobed, spreading, regular, hairy at the throat; lobes usually acuminate, sometimes rounded, valvate in æstivation. Stamens 5, inserted near the throat of the corolla; filaments very short; anthers narrowly linear. Disk annular or tumid. Ovary 2-celled; style slender, divided

above; ovules very numerous, inserted on the fleshy placentas. Fruit usually fleshy and indehiscent, rarely loculicidally dehiscent and dry, often obtusely ribbed, crowned by the calyx-lobes or their remains, 2-celled; seeds very numerous, usually minute.—Climbing or erect shrubs, with opposite rather thin leaves; interpetiolar, solitary or geminate, usually deciduous stipules; cymose terminal, mostly yellow flowers, and deciduous bracts and bracteoles.

A considerable genus, occurring also in Madagascar and the Mascarene Islands, and in the hotter parts of Asia and the Indian Archipelago.

Fruit indehiscent, $\frac{1}{3}$–$1\frac{1}{4}$ in. long. Leaves mostly exceeding 3 in.
- Calyx-lobes, at least 4 of them, short, rounded or apiculate or deltoid, not subulate nor linear.
  - Inflorescence dense.
    - Corolla clothed with deflexed hairs. Lateral veins of the leaves 10–14 on each side of the midrib . . 1. *M. Afzelii.*
    - Corolla puberulous outside. Lateral veins of the leaves 6-7 on each side of the midrib . . . . . 2. *M. Isertiana.*
  - Inflorescence rather lax. Corolla glabrous outside. Lateral veins 4 on each side of the midrib of the leaves . . 3. *M. polita.*

Calyx-lobes, or at least 4 of them, long, linear or subulate.
- Stipules ovate lanceolate or subulate, $\frac{3}{8}$ in. long or less.
  - Branchlets glabrate or pubescent or hispid with deflexed hairs.
    - Corolla glabrous or nearly so outside.
      - Corolla-tube slender, straight; lobes acuminate. Fruit oblong . . . . . 4. *M. stenocarpa.*
      - Corolla-tube funnel-shaped above, often curved; lobes not acuminate. Fruit subglobose or ellipsoidal . . . . . 5. *M. arcuata.*
    - Corolla hispid or hirsute outside.
      - One calyx-lobe often produced into a large dilated white or coloured lamina.
        - Enlarged calyx-lobe white; the other lobes filiform or subulate . . . . . 6. *M. tenuiflora.*
        - Enlarged calyx-lobe bright red; the other lobes lanceolate . . . . . 7. *M. erythrophylla.*
      - Calyx-lobes subequal, or at least uncoloured . . . 8. *M. elegans.*
  - Branchlets hispid with hairs directed upwards . . . . 9. *M.? heinsioides.*
- Stipules broadly ovate, about $\frac{4}{5}$ in. long . . . . . 10. *M.? platyphylla.*

Calyx-lobes, or at least 4 of them, long, elliptical, much acuminate . . . . . 11. *M. grandiflora.*

Fruit loculicidally dehiscent, $\frac{1}{4}$ in. long. Leaves not exceeding 3 inches in length . . . . . 12. *M. luteola.*

1. **M. Afzelii,** *G. Don, Gen. Syst.* iii. p. 490, (1834). A shrub of 4–6 ft., perhaps subscandent. Branches terete tawny-subtomentose at the extremities. Leaves oval, shortly and abruptly acuminate, rounded or obtuse at the base, paler beneath, shortly scabrid-hispid on both sides, 3–6 by $1\frac{1}{2}$–3 in., or the upper ones rather smaller; lateral veins 10–14 on each side of the midrib; tertiary veins oblique; stipules ovate, often bifid; petiole $\frac{1}{10}$–$\frac{1}{2}$ in. Flowers yellow, $\frac{3}{4}$–1 in. long, tawny-tomentose outside, subsessile, in dense pedunculate terminal and lateral cymes. Calyx hemispherical and $\frac{1}{5}$–$\frac{1}{4}$ in. diameter in flower; lobes short, rounded or apiculate, persistent, subequal or one produced into a white or yellowish subrotund acuminate hispidulous

stalked lamina, 2½–4 in. long. Corolla-tube cylindrical, clothed with reflexed hairs; limb small; lobes rounded. Fruit ellipsoidal (when fully ripe), 1–1¼ in. long, obscurely ribbed, hispidulous.—Hasskarl, Retzia i. p. 37, (1855).

Upper Guinea. Sierra Leone, *Afzelius! G. Don! H. Smeathman! Barter! Winwood Reade!* Abòh, *Th. Vogel!*

Lower Guinea. South of the Line, *Curror!*

2. **M. Isertiana,** *DC. Prod.* iv. p. 371. A climbing or bushy shrub of 6–15 ft. Branches terete and glabrate, or at the apex sub-quadrangular and puberulous. Leaves oval, shortly and suddenly acuminate, obtuse or somewhat wedge-shaped at the base, membranous, mostly glabrate except the veins which especially beneath are often hispidulous; 4–8 by 2–4 in., upper ones smaller; lateral veins 6–7 on each side of the midrib; tertiary veins numerous, slender, parallel, somewhat curving; petiole ¼–⅓ in. Stipules short, deltoid, undivided or bipartite, at first shortly hairy, at length glabrate and recurved or caducous. Flowers 1¼–1¾ in. long, subsessile, crowded in dense terminal and sub-terminal pedunculate cymes; peduncles ½–2 in. Calyx shortly and appressedly hairy, about ⅙ in. long; limb hemispherical, 5-cleft, wider than the tube; lobes deltoid, subequal or sometimes one lobe produced into a white, rounded, apiculate, subglabrous, stalked lamina, 1–2½ in. long. Corolla tubular, yellow, appressedly and closely puberulous (or rarely obsoletely so) outside; limb ⅓–½ in. diameter; throat woolly; lobes ovate. Fruit ellipsoidal, glabrous, ⅝–¾ in. long, not ribbed.—*M. macrophylla*, Schum. et Vahl. in Schum. et Thonn. Pl. Guin. p. 118, non Wall.

Upper Guinea. Whydah, Slave Coast, *Isert;* Sierra Leone (*Th. Vogel!*), *G. Don!* Abbeokouta, *Irving!* Niger Expedition at Lagos Island, *Barter!* Cameroon River, *Mann!*

Var. β.? *laxiflora*, Benth. in Hook. Niger Fl. 393. Leaves pilose, more hairy. Fruits few.

Upper Guinea. Fernando Po, *Th. Vogel!*

Var. γ. *glabriflora.* Flowers glabrous or very nearly so, fragrant. A subscandent shrub.

Upper Guinea. Niger Expedition at Brass, *Barter!*

3. **M. polita,** *Hiern.* A glabrous, shining, climbing shrub, 20 ft. high. Branches straight, terete, reddish. Leaves elliptical, caudate-acuminate, wedge-shaped at the base, spreading, 3–4 by 1–1¼ in.; lateral veins 4, on each side of the midrib; tertiary veins transverse, approximated, delicate; petiole ⅛–¼ in. Stipules undivided (or bipartite?), glabrous, narrowly linear from a broad base, ¼–⅓ in. long, caducous, leaving a more or less hairy rim above the scar. Flowers 1¼–1½ in. long, shortly pedicellate in rather lax terminal panicles having spreading branches or peduncles. Calyx glabrous; tube oblong, indistinctly 10-ribbed, ⅛–¼ in. long; teeth very short, one usually produced into a white? stalked, dilated lamina, 2½–3¼ by ⅝–1½ in., stalk about ½ in. Corolla-tube elongate, straight, slender, glabrous outside; limb ⅓–½ in. diameter, yellow; throat densely hairy with

crisped hairs; lobes ovate, not acuminate. Fruit ellipsoidal, $\frac{1}{3}$ in. long or more.

Upper Guinea. 1° N. Lat. Mount John River, Kongui. *Mann!*

4. **M. stenocarpa,** *Hiern.* A small shrub, hispidulous towards the extremities. Leaves oval, shortly acuminate, wedge-shaped and often oblique at the base, 4–5$\frac{1}{2}$ by 1$\frac{1}{2}$–2 in., or the uppermost ones smaller, sparingly hispidulous-strigillose above, hispidulous on the veins beneath; lateral veins about 7 on each side of the midrib, at about 45° with it; tertiary veins transverse and in various directions, not conspicuous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. Stipules bicuspidate, about $\frac{1}{5}$ in. long. Flowers about 1$\frac{1}{2}$ in. long, shortly pedicellate, in rather dense trichotomous corymbose cymes. Calyx shortly and appressedly hairy or subglabrate, narrowly turbinate, $\frac{1}{6}$–$\frac{1}{3}$ in. long; teeth subulate, about $\frac{1}{8}$ in. long, one sometimes produced into a stalked, yellow? 5-nerved, roundly oval lamina, 2 by 1$\frac{1}{2}$ in., stalk 1$\frac{1}{4}$ in. Corolla-tube narrowly cylindrical, puberulous or nearly glabrous; limb $\frac{1}{2}$ in. diameter, yellow; throat hispid-tomentose; lobes oval, apiculate. Fruit oblong, obscurely 10-ribbed, $\frac{1}{3}$–$\frac{3}{4}$ by $\frac{1}{5}$ in.

North Central. Monbuttu land, near Munsa, *Schweinfurth!*

5. **M. arcuata,** *Poir. in Lam. Encycl. Méth.* iv. p. 392. A shrub of climbing or voluble habit, about 6–8 ft. high, usually glabrate. Branches subterete, reddish or glaucescent, sometimes shortly hispid-pubescent above. Leaves ovate or elliptical, narrowly acuminate, wedge-shaped or rounded at the base, glabrous or nearly so or hispidulous on the veins and margins, paler beneath, veiny, 1–6 by $\frac{5}{12}$–2$\frac{1}{2}$ in.; lateral veins 5–7 on each side of the midrib; tertiary veins transverse; petiole $\frac{1}{12}$–$\frac{1}{2}$ in. Stipules bipartite or tripartite or cleft, mostly glabrate and reflexed, caducous and usually leaving a more or less hairy rim above their scar; partitions lanceolate or subulate, $\frac{1}{4}$–$\frac{3}{8}$ in. long. Flowers 1–1$\frac{1}{2}$ in. long, shortly pedicellate, in lax terminal panicles having spreading or arching branches or peduncles. Calyx glabrous or sparingly hispidulous; tube turbinate-oblong or oblong, $\frac{1}{6}$–$\frac{1}{5}$ in. long; teeth linear or subulate, equalling or rather shorter than the tube, lengthening with it in fruit, subequal or occasionally one produced into a white dilated acuminate lamina, 1–1$\frac{1}{2}$ in. long, caducous. Corolla-tube elongate-funnel-shaped, glabrous outside, usually curved; limb $\frac{1}{2}$–1 in. diameter, yellow, tomentose with crisped hairs at the orange or purplish throat; lobes oval or ovate, not acuminate. Fruit subglobose or ellipsoidal, $\frac{1}{2}$–$\frac{2}{3}$ in. long, fleshy, glabrous.—*Landia stelligera* et *L. astrographa,* Commerson ex DC. Prod. iv. p. 372.

Upper Guinea. Fernando Po, *Mann!* Niger, Nupe, *Barter!*

Nile Land. Djurland, *Schweinfurth!* Niamniam-land, *Schweinfurth!* Bongo-land, *Schweinfurth!*

Lower Guinea. Pungo Andongo, *Welwitsch!* Cazengo, *Welwitsch!*

Mozamb. Distr. Manganja Hills, *H. Waller!* alt. 3000 ft.; near Kankanje, *Kirk!*

Occurs also in Mauritius and Madagascar.

6. **M. tenuiflora,** *Benth. in Hook. Niger Fl.* p. 392, (1849). A subscandent shrub of 8–10 ft. or more. Leaves oval, shortly and abruptly acuminate, rounded or somewhat wedge-shaped at the base, hispid, paler beneath, 1½–6 by 1–3¼ in.; lateral veins 8–10 on each side of the midrib; tertiary veins oblique; petiole ⅓–1 in. Stipules ovate or lanceolate, acute, hispid, usually bipartite, sometimes bifid. Flowers 1–1¼ in. long, subsessile, crowded in pedunculate or branched terminal or subterminal cymes. Calyx hispid; tube short in flower; teeth filiform or subulate, persistent, ⅛–¼ in. long, subequal or one produced into a white, dilated, somewhat hairy, caudate-apiculate, stalked lamina, 2–4 in. long. Corolla shortly and appressedly hispid outside; tube green outside, slender, cylindrical; limb about ⅓–½ in. diameter, yellow; throat closed with yellow hairs; lobes ovate, spreading, acuminate. Fruit ellipsoidal, ½–⅗ in. long, hispid or puberulous, crowned by the subulate calyx-teeth.

Upper Guinea. Fernando Po, *Th. Vogel! Barter! Mann!* Old Calabar, *Rev. W. C. Thomson! Dr. Robb!*

7. **M. erythrophylla,** *Schum. et Thonn. Pl. Guin.* p. 116. A small shrub of a few feet or climbing to 30-40 ft. Shoots softly pubescent. Leaves ovate, sharply acuminate, wedge-shaped or rounded at the base, membranous, hispidulous especially on the veins, paler and sometimes subtomentose beneath, 2–7 by 1–4 in.; lateral veins about 10 on each side of the midrib; tertiary veins oblique; petiole ¼–2 in. Stipules ovate or lanceolate, about ⅜ in. long, bifid, usually reflexed and glabrous inside. Flowers 1–1½ in. long, shortly pedicellate and subsessile, in dense pedunculate cymes. Calyx-tube ⅙–¼ in. long, densely hirsute, obovoid; lobes red, lanceolate, hirsute, ⅓–½ in. long, subequal or one produced into a bright vermilion, subrotund, abruptly acuminate, softly pilose, spreading, stalked lamina, 2–4½ in. long. Corolla-tube cylindrical, densely hirsute with reddish hairs; limb ½–¾ in. diameter; throat bearded; lobes rounded, apiculate, white or yellowish inside. Fruit egg-shaped, ⅔–1 in. long, hirsute with reddish hairs, mostly crowned by the calyx-lobes.—*M. fulgens,* R. Br. ex Tedlie in Bowdich, Mission, p. 374, name only (1819). *M. splendida,* Welw. in Trans. Linn. Soc. Lond. xxvii. p. 36, t. 13.

Upper Guinea. Aquapim, *Thonning, Winwood Reade!* Ashantee, *Tedlie!* Cameroon Mountains, *Mann!*
North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. Niamniam-land, *Schweinfurth!*
Lower Guinea. Angola, *Monteiro! Welwitsch!* Loango, *Soyaux!*

8. **M. elegans,** *Schum. et Thonn. Pl. Guin.* p. 117. A much branched shrub, half or fully scandent, 5–10 ft. high or more. Shoots subterete, hispid-pubescent. Leaves oval, acuminate, wedge-shaped or obtuse at the base, hispidulous especially on the veins beneath, membranous, 1–4½ by ½–2½ in.; lateral veins 9–11 on each side of the midrib; tertiary veins curving; petiole 1/10–1 1/10 in. Stipules lanceolate or subulate, geminate or bipartite, hairy. Flowers bright

scarlet, shortly pedicellate in pedunculate cymes. Calyx hispid; tube short; lobes linear, subobtuse, $\frac{1}{3}$–$\frac{1}{2}$ in. long, persistent, subequal or one occasionally subfoliaceous. Corolla-tube $\frac{2}{3}$–1 in. long, densely hirsute outside, salver-shaped; limb spreading, $1\frac{1}{2}$–$2\frac{1}{4}$ in. diameter, red within with a yellow-hairy throat, pale yellow or orange-coloured outside; lobes rounded, apiculate. Fruit egg-shaped, $\frac{3}{4}$ in. long, not or obscurely ribbed.—*Gardenia coccinea*, G. Don! in Edinb. Phil. Journ. xi. p. 343 (1824). *Bertiera coccinea*, G. Don! Gen. Syst. iii. p. 506. *M. discolor*, Thonn. ex DC. Prod. iv. p. 372, non Pet.-Th.

Upper Guinea. Widely spread.
North Central. Monbuttu land, *Schweinfurth!*
Lower Guinea. Golungo Alto, *Welwitsch!*

9. **M.? heinsioides,** *Hiern.* Branches subterete or obtusely quadrangular; shoots opposite, erect-patent, hispid with hairs directed forward. Leaves oval, acuminate, rounded or somewhat wedge-shaped at the base, chartaceous, glabrate above except the midrib, somewhat hairy on the veins beneath, sparingly ciliate, 2–4 by 1–2 in.; petiole $\frac{1}{10}$–$\frac{1}{8}$ in. long, hispid with forward hairs; lateral veins about 6–8 pairs, rather slender; tertiary veins oblique; stipules subulate, 2 together or bipartite, about $\frac{1}{6}$ in. long. Flowers about 3 together in terminal cymes; peduncle and pedicels about $\frac{1}{8}$ in. long in fruit. Calyx-lobes linear-spathulate, $\frac{1}{4}$ in. long, enlarging to $\frac{3}{8}$ in fruit. Fruit ovoid, terete, sparingly hispid, about $\frac{3}{8}$ in. long, exclusive of the persistent calyx-segments.

Lower Guinea. Congo, *Chr. Smith!*

10. **M.? platyphylla,** *Hiern.* Puberulous. Branches roundedly and unequally 4-sided, sulcate; branchlets spreading. Leaves broadly ovate, subacuminate, broad near the suddenly narrowed base, shortly pubescent at least on the veins, firmly chartaceous, 3–8 by 2–$5\frac{1}{2}$ in.; petiole ranging up to 1 in. or more; margins broadly reflexed; lateral veins about 12; stipules broadly ovate, about $\frac{4}{5}$ in. long, obtuse. Berries ovoid, $\frac{2}{3}$–$\frac{3}{4}$ by $\frac{3}{8}$-$\frac{1}{2}$ in., 10-ribbed, not quite glabrous, crowned by the five linear-subulate puberulous calyx-lobes which are $\frac{2}{5}$–$\frac{3}{5}$ in. long, subsessile, in terminal corymbose cymes. Seeds numerous, obtusely angular, not minute.

North Central. Monbuttu-land, *Schweinfurth!*

11. **M. grandiflora,** *Benth. in Hook. Niger Fl.* p. 392. Shoots clothed with deflexed-patent ferruginous pilose hairs. Leaves oval, acuminate, rounded or subcordate at the base, very shortly petiolate, sparingly strigose, pubescent and darker above, 3–4 by $1\frac{1}{4}$–2 in.; lateral veins 10–13 on each side of the midrib, hispid beneath. Stipules geminate, linear-lanceolate, pilose on the back and margins, glabrous within, recurved, caducous, about $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers dense, sessile or subsessile in pedunculate cymes; bracts linear, acute, about equalling the stipules. Calyx densely clothed with ferruginous pilose hairs; tube small; lobes elliptical, much acuminate, herbaceous or perhaps coloured, $\frac{3}{4}$ by $\frac{1}{4}$ in., subequal or in some flowers one produced

into a white oval acuminate stalked, more or less hairy lamina 3–4 in. long. Corolla densely hirsute outside; lobes acuminate; throat pilose.

Upper Guinea. Sierra Leone, *G. Don!*
May prove to be *M. rufa*, A. Rich. in Mém. Soc. Hist. Nat. Par. v. p. 246 (1834).

12. **M. luteola,** *Delile Cent. Pl. Afr. Cailliaud*, p. 65, t. 1, f. 1, *excl. syn.* (1826); *non Hochst.* A closely branched shrub; branches at an acute angle, pubescent towards the apex. Bark stringy. Leaves ovate or oval, subacuminate, obtuse or wedge-shaped and mostly oblique at the base, shortly and appressedly pubescent at least on the veins beneath, 1–3 by $\frac{3}{8}$–$1\frac{1}{2}$ in. or those of the abbreviated lateral branches smaller; lateral veins about 6–7 on each side of the midrib; tertiary veins inconspicuous; petiole very short. Stipules subulate. Flowers abont 1 in. long, subsessile and shortly pedicellate, in rigid terminal cymes. Calyx pubescent; tube oblong, about $\frac{1}{10}$ in. long, afterwards longer; teeth filiform, $\frac{1}{8}$–$\frac{1}{3}$ in. long, caducous, subequal or one produced into a pale lemon-coloured oval or rotund apiculate nearly glabrous stalked lamina 1–$1\frac{3}{4}$ in. long; stalk $\frac{1}{3}$–1 in. long. Corolla canary-yellow, sweet-scented; tube narrow, cylindrical, pubescent; limb about $\frac{1}{2}$ in. diameter; throat hispid-tomentose; lobes ovate caudate-acuminate. Fruit oblong, hispidulous or glabrate, about $\frac{1}{4}$ in. long, at length dehiscing loculicidally.—*Mussænda*, n. sp., T. Thoms. in Speke Journ., App. p. 636; *Vignaudia luteola*, Schweinf. in Schweinf. et Aschers. Enum. p. 282 (1867).

Nile Land. Nubia, Singué, *Cailliaud;* White Nile, *Petherick!* Gani and Madi, *Speke and Grant!* Mittu-land, *Schweinfurth!*

16. PAURIDIANTHA, Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 69.

Calyx-tube campanulate or hemispherical; limb small, broad, 5-toothed, persistent. Corolla suburceolate, hairy at the throat, 5-cleft; lobes ovate, subobtuse, reflexed, valvate in æstivation. Stamens 5, inserted near the throat of the corolla; filaments short; anthers shortly oblong, subexserted. Disk forming a thick cushion-like ring. Ovary 2-celled; style robust; stigma oblong obscurely 2-lobed; ovules numerous. Fruit globose, 2-celled, many-seeded. Seeds small.—A nearly glabrous leafy shrub with slender branches, opposite submembranous leaves, interpetiolar subulate stipules and minute nearly solitary axillary flowers.

A monotypic genus.

1. **P. canthiifolia,** *Hook. f. in Benth. et. Hook. f. Gen. Pl.* ii. p. 70. Height 12–15 feet. Branches strigose-puberulous above. Leaves elliptical, acuminate, glabrous, wedge-shaped at the base, 1–$2\frac{1}{2}$ by $\frac{1}{2}$–1 in.; petiole $\frac{1}{12}$–$\frac{1}{4}$ in. Peduncles short, puberulous. Calyx green. Corolla light red. Fruit $\frac{1}{5}$ in. diameter, glabrous, apparently indehiscent.

Upper Guinea. Fernando Po Island, *Mann!*

17. **UROPHYLLUM,** Wall.; Benth. et Hook. f. Gen. Pl. ii. p. 71.

Calyx-tube more or less turbinate in flower, globular in fruit; limb hemispherical, wider than the tube, usually truncate; teeth usually 5, obsolete minute or small. Corolla coriaceous, shortly tubular; 2–3 times the length of the calyx; lobes usually 5, ovate or lanceolate, valvate in æstivation; throat shaggy. Stamens usually 5, inserted at or near the throat of the corolla; filaments usually short; anthers linear or lanceolate, included. Disk tumid, annular, hairy or glabrous. Ovary 4–5 celled; style puberulous or glabrous, often clavate; stigma entire or cleft at the apex; ovules numerous. Berry pisiform, 4–5-celled; seeds small, testa crustaceous, albumen fleshy.—Shrubs or small trees, with opposite petiolate submembranous or subcoriaceous leaves, interpetiolar stipules and short flowers in axillary cymes.

A genus of several species occurring also in Tropical Asia and Madagascar.

Inflorescence wholly axillary.	
Calyx-teeth minute or obsolete. Flowers $\frac{1}{5}$–$\frac{1}{3}$ in. long.	
Stipules foliaceous, $\frac{2}{3}$–1 in. long. Leaves with 20–26 lateral veins on each side of the midrib.	
Leaves wedge-shaped at the base	1. *U. hirtellum.*
Leaves usually rounded at the base	2. *U. callicarpoides.*
Stipules $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaves with 8–18 lateral veins on each side of the midrib.	
Leaves obtuse at the base; lateral veins about 15–18 pairs	3. *U. insulare.*
Leaves wedge-shaped at the base; lateral veins about 8–11 pairs	4. *U. rubens.*
Stipules $\frac{1}{6}$–$\frac{1}{5}$ in. long. Leaves with 7–9 lateral veins on each side of the midrib	5. *U. Afzelii.*
Calyx-teeth lanceolate or ovate, not minute. Flowers small	6. *U. paucinerve.*
Calyx-teeth subulate-filiform, not minute. Flowers very small	7. *U. micranthum.*
Inflorescence in quasi-terminal and axillary cymes	8. *U. viridiflorum.*

1. **U. hirtellum,** *Benth. in Hook. Niger Fl.* p. 397. A shrub of 15 feet. Shoots puberulous or at the extremities hirsute-pubescent. Leaves elliptical, acutely acuminate, wedge-shaped or attenuate at the base, firmly chartaceous, pubescent or puberulous on the numerous (22–26) veins and midrib, shining above, rather paler beneath; 4–11 by $1\frac{1}{2}$–4 in.; petiole $\frac{1}{3}$–$1\frac{1}{2}$. Stipules ovate, obtuse, foliaceous, solitary, undivided, puberulous, $\frac{2}{3}$ in. long, fugacious. Flowers $\frac{1}{5}$–$\frac{1}{4}$ in. long, glabrous outside, shortly pedicellate, in dense many-flowered puberulous axillary cymes scarcely equalling the petioles. Calyx-limb hemispherical, truncate, with 5 minute teeth. Corolla twice the length of the calyx, 5-cleft; throat shaggy; lobes lanceolate, obtuse. Style hairy; stigma bifid. Fruit globose, $\frac{1}{3}$ in. diameter, 4–5-celled.

Upper Guinea. Abòh, *Th. Vogel!* Bagroo River, *Mann!* Old Calabar River, *Mann!*

2. **U. callicarpoides,** *Hiern.* A strigose-hispid tree, 30 feet high. Leaves oblong, much acuminate, rounded or somewhat excavated rarely somewhat narrowed at the base, submembranous, 8–16 by

1¾–4 in.; lateral veins 20–24 on each side of the midrib, depressed on the upper surface; petiole about ⅓–⅜ in.; stipules ovate, about 1 in. long, caducous. Flowers glabrous outside, about ⅕ in. long, on short hairy pedicels, many together in short axillary closely branched cymes which are about double or treble the length of the petiole. Calyx about half the length of the flower; limb hemispherical, truncate; teeth minute. Corolla-tube short, shaggy inside; lobes ovate-lanceolate, glabrous on both sides. Disk tumid, hairy. Style club-shaped, more or less hairy above. Ovary 4?-celled.

Upper Guinea. Muni River, 1° N. Lat., *Mann!*

3. **U. insulare,** *Hiern.* A small nearly glabrous tree. Leaves oval or oval-lanceolate, acuminate, obtuse at the base, glossy, submembranous, 4–9 by 1¾–3¼ in.; lateral veins slender 15–18 on each side of the midrib; petiole ⅓–⅔ in., channelled above; stipules lanceolate caducous, about ⅓ in. long, margins much involute. Flowers glabrous outside, about ⅓ in. long, on rather longer obsoletely puberulous pedicels, in axillary cymes which measure 1–1½ in. long. Calyx about ⅓ the length of the flower; limb hemispherical, truncate; teeth obsolete. Style club-shaped, obsoletely puberulous as well as the disk. Ovary 4–5-celled. Fruit ¼ in. diameter.

Upper Guinea. I. St. Thomas, *Mann!* summit of the peak.

Specimens of a small tree, 20–25 feet high, from Prince's Island (*Mann!*) in young flower-bud with narrow pubescent bracts elongate-lanceolate leaves and petioles shortly pubescent above, apparently belongs to this species.

4. **U. rubens,** *Benth. in Hook. Niger Fl.* p. 396. A glabrous shrub, 6 feet high, glabrous except the minutely puberulous buds and inflorescence. Branches dark-reddish in the dry state. Leaves elliptical, subacuminate, wedge-shaped at the base, reddening when dry especially on the veins, thinly coriaceous, shining; lateral veins 8–11 on each side of the midrib; margins revolute; 3–6 by 1¼–2½ in.; petiole ⅜–⅝ in. Stipules ovate-oblong or obovate, ¼–½ in. long, caducous. Flowers about ⅕ in. long, glabrous or very nearly so, rather exceeding their pedicels, about 10–30 together forming shortly pedunculate axillary cymes which scarcely exceed the petiole. Calyx-limb subhemispherical, truncate, entire, 1/12–1/10 in. diameter. Corolla about twice the length of the calyx; throat shaggy. Style shortly pubescent below, entire. Ovary 4-celled.

Upper Guinea. Fernando Po Island, *Th. Vogel! Capt. Arabin!* Sierra Leone, *Afzelius!*

The red dye used by the natives of Fernando Po.

5. **U. Afzelii,** *Hiern.* Branches slender, terete, softly puberulous. Leaves elliptic-oblong, acuminate, wedge-shaped at the base, glabrate and rather glossy except the puberulous midrib, firmly chartaceous; margins revolute, obsoletely ciliate, 2–3 by ½–⅘ in.; lateral veins about 7-9 pairs, slender, not conspicuous; petiole 1/10–⅛ in. long, puberulous; stipules subulate, puberulous, ⅙–⅕ in. long. Flowers ¼ in. long, pentamerous, nearly glabrous outside, few together on short slender puberulous pedicels, in abbreviated axillary clusters which

slightly exceed the petiole. Calyx-limb hemispherical, with short teeth, persistent, about $\frac{1}{15}$ in. diameter in flower. Corolla much exceeding the calyx; throat bearded; lanceolate. Style puberulous. Ovary imperfectly 4-celled, at one end only 2-celled. Berry $\frac{1}{8}$ in. diameter.

Upper Guinea. Sierra Leone, *Afzelius!*

Very near the East Indian species *U. parviflorum*, Br., but differs by the smaller stipules, fewer flowers, &c.

6. **U. paucinerve,** *Hiern.* A glabrous shrub, 10–15 feet high. Shoots terete, slender. Leaves narrowly elliptical, much acuminate, attenuate at the base, submembranous, $2\frac{1}{2}$–4 by $\frac{1}{2}$–$1\frac{1}{5}$ in.; lateral veins 7–8 on each side of the midrib; petiole $\frac{1}{6}$–$\frac{2}{5}$ in. long; stipules subulate, $\frac{1}{4}$ in. long; internodes about $\frac{1}{4}$–$\frac{1}{3}$ of the length of leaves. Flowers small, on short slender glabrous pedicels in abbreviated axillary cymes. Calyx green; teeth lanceolate or ovate. Corolla red. Fruit about $\frac{1}{6}$ in. diameter.

Upper Guinea. Fernando Po, alt. 4000 feet, *Mann!*

7. **U. micranthum,** *Hiern.* A puberulous shrub, 8 feet high. Branchlets divaricate straight terete slender inconspicuously strigose. Leaves ovate-elliptical, acuminate, mucronate, obtuse at the base, glossy and glabrous above except midrib, puberulous on the veins beneath, submembranous, spreading, 1–$3\frac{1}{4}$ by $\frac{1}{2}$–$1\frac{1}{12}$ in.; lateral veins 8–12 on each side of the midrib, slender; petiole $\frac{1}{12}$–$\frac{1}{8}$ in.; stipules needle-shaped, erect, about $\frac{1}{5}$ in. long; internodes about $\frac{1}{3}$ of the length of the leaves. Flowers very small, subsessile, several together, in dense axillary abbreviated cymes. Calyx-teeth subulate-filiform, incurved over the apex of the fruit. Fruit glabrous, $\frac{1}{10}$ in. diameter, 4-celled.

Upper Guinea. Sierra del Crystal, 1° N. Lat., *Mann!*

8. **U. viridiflorum,** *Schweinf. in Herb.* An erect puberulous yellowish green shrub, 20 feet high. Branchlets obtusely quadrangular. Leaves oval-oblong, subacuminate, obtusely wedge-shaped at the base, subcoriaceous, ranging up to $5\frac{1}{2}$ by $2\frac{1}{2}$ in. or more; petiole to $\frac{1}{2}$ in.; lateral veins 15–20 on each side of midrib, depressed on the upper surface; stipules ovate, $\frac{3}{8}$–$\frac{5}{8}$ in. Flowers $\frac{1}{8}$–$\frac{1}{7}$ in. long, on very short pedicels, several together in dense pedunculate corymbs forming branched quasi-terminal and axillary panicled cymes. Calyx short; limb 5–6-toothed. Corolla 4–6-lobed, greenish, much exceeding the calyx. Stamens enclosed in the tomentum of the throat of the corolla; connective 2-dentate; filaments very short. Style equalling the corolla, pubescent at the middle. Stigma capitate, 4-lobed. Ovary 4-celled; ovules several together.

North Central. Monbuttu-land, near Munsa, *Schweinfurth!*

18. SABICEA, Aubl.; Benth. et Hook. f. Gen. Pl. ii. 72.

Calyx-tube campanulate in flower, globular in fruit; limb 3–6-usually 5-partite or rarely 5-cleft and then not wider than the inferior

portion; lobes not small, often foliaceous or elongated. Corolla tubular, often narrowly so; lobes 5 or rarely 4 or 6, lanceolate or ovate, short, valvate in æstivation. Stamens 5, inserted at the throat of the corolla or below. Disk annular, fleshy, crenulated. Ovary usually 5-celled, or in doubtful species 2-celled; cells many-ovuled; style clavate, usually cleft into 4–5 linear or oblong lobes. Berry usually 4–5-celled, pisiform; seeds small.—Shrubs usually scandent with opposite petiolate submembranous leaves, interpetiolar stipules, and flowers of moderate size in axillary usually capitate cymes usually involucrate with bracts of moderate size.

A genus of several species occurring also in Tropical America and Madagascar.

Ovary 4–5-celled.
- Bracts involucrate.
  - Common peduncles long (1–4 in.).
    - Calyx-lobes linear-filiform . . . . . 1. *S. ferruginea.*
    - Calyx-lobes oval . . . . . 2. *S. calycina.*
  - Common peduncles short (not exceeding $\frac{2}{3}$ in.).
    - Calyx-lobes elliptic-lanceolate, $\frac{1}{3}$–$\frac{5}{8}$ in. long. Leaves pilose . . . . . 3. *S. pilosa.*
    - Calyx-lobes linear, $\frac{1}{4}$–$\frac{3}{8}$ in. long. Leaves sparsely pilose . . . . . 4. *S. Vogelii.*
    - Calyx-lobes lanceolate or linear-lanceolate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Leaves short-cottony . . . . . 5. *S. capitellata.*
- Bracts not involucrate . . . . . 6. *S. venosa.*

Ovary 2-celled.
- Stipules $\frac{1}{8}$ in. long. Flowers in axillary clusters . . . 7. *S.? segregata.*
- Stipules 1–1$\frac{1}{2}$ in. long. Flowers in lateral clusters.
  - More or less pubescent. Calyx-lobes linear or lanceolate. Flowers clustered on the branches . . . 8. *S.? cauliflora.*
  - Nearly glabrous. Calyx-lobes linear-filiform. Flowers near the ground . . . . . 9. *S.? geantha.*

1. **S. ferruginea,** *Benth. in Hook. Niger Fl.* p. 397. A climbing shrub, with terete subferruginous pubescent-tomentose branches and peduncles. Leaves oval, shortly acuminate, rounded, somewhat excavated or obtusely narrowed and more or less unequal at the base, dark and glabrescent (except the puberulous midrib) above, ferruginous and shortly tomentose beneath, 3–6 by 1$\frac{1}{2}$–2$\frac{1}{2}$ in.; lateral veins 16–20 on each side of the midrib; petiole $\frac{1}{3}$–1 in.; stipules ovate, acute, about $\frac{1}{2}$ in. long. Flowers pentamerous, $\frac{2}{3}$–$\frac{3}{4}$ in. long, shortly pedicellate, many together in dense hemispherical pedunculate capitate cymes of 2 in. diameter; peduncles axillary, 3–4 in. long; bracts ovate or lanceolate, acute $\frac{3}{4}$–1 in. long, involucrate. Calyx tubular, the inferior portion short, campanulate, hispid-pubescent; the free portion of the tube subglabrous; lobes linear-filiform, pilose-pubescent, nearly equalling the corolla-tube, acute. Corolla slender, tube subglabrous below, appressedly pubescent above; teeth lanceolate, short, hairy outside. Anthers linear, inserted below the middle of the corolla. Ovary 4–5-celled. Fruit pisiform.—*Cephaelis ferruginea,* G. Don, Gen. Syst. iii. p. 605.

Upper Guinea. Sierra Leone, *G. Don!* Bagroo River, *Mann!*

2. **S. calycina,** *Benth. in Hook. Niger Fl.* p. 399. A twining or trailing shrub of 1–20 ft.; branches sometimes rooting, glabrate. Leaves oval-ovate, subacuminate, obtuse or excavated at the base, subglabrous except the pilose nerves beneath, 1–5 by $\frac{1}{2}$–$2\frac{1}{4}$ in.; lateral veins 7–12 on each side of the midrib; petiole ranging up to 1 in. or more; stipules broadly ovate, acute, $\frac{1}{5}$–$\frac{1}{3}$ in. long. Flowers $\frac{1}{2}$–$\frac{3}{4}$ in. long, glabrous, subsessile, several together in subglobose capitate pedunculate cymes $\frac{1}{2}$–1 in. diam.; peduncles 1–$3\frac{1}{2}$ in. long, glabrous; bracts $\frac{1}{3}$–$\frac{1}{2}$ in. long, broad, involucrate. Calyx-tube short; lobes 3–5, unequal, foliaceous, oval, reddish or white, $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in. Corolla white outside; lobes 5, short, ovate. Style 4–5-cleft. Fruit 4–5-celled, $\frac{1}{8}$ in. diameter.

Upper Guinea. Fernando Po, *Th. Vogel! Barter! Mann!* Niger, *Barter!*

3. **S. pilosa,** *Hiern.* A prostrate and climbing undershrub, 10 ft. high, with terete pilose-hirsute shoots, leaves, petioles, bracts and peduncles. Leaves obovate-elliptical, shortly and acutely acuminate, attenuate at the base, thin, $3\frac{1}{2}$–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; petiole 1–3 in.; lateral veins 12–14, inconspicuous; stipules ovate, caudate-acute, reflexing, $\frac{1}{3}$–$\frac{2}{5}$ in. long, glabrous inside. Flowers $\frac{3}{5}$–$\frac{4}{5}$ in. long, sessile, a few together in shortly pedunculate usually clustered lateral capitate cymes; bracts about 6, ovate, $\frac{1}{4}$–$\frac{1}{2}$ in., involucrate. Calyx-tube short, densely-pilose; lobes 5–6, elliptic-lanceolate, unequal, ciliate and somewhat pilose, membranous, coloured?, mostly acute, erect-patent. Corolla silky outside, not exceeding the calyx; lobes 5, lanceolate. Anthers 5, sessile at the thinly bearded throat of the corolla. Style 5-cleft at apex, glabrous. Disk glabrous.

Upper Guinea. Corisco Bay, 1° N. lat., *Mann!*

4. **S. Vogelii,** *Benth. in Hook. Niger Fl.* p. 398. A twining shrub, with terete glabrescent branches. Leaves oval or ovate, acuminate, obtuse and oblique at the base, sparsely and appressedly pilose at least above, hairy on the veins beneath, $1\frac{1}{2}$–4 by $\frac{2}{3}$–$1\frac{2}{3}$ in., or the upper ones smaller; lateral veins about 8 on each side of the midrib; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules varying from subrotund to linear, about $\frac{1}{4}$ in. long. Flowers 4–6-merous, about $\frac{1}{2}$ in. long, white, shortly pedicellate, many together in globose pedunculate subcapitate cymes of about 1 in. diameter; common peduncle $\frac{1}{6}$–$\frac{2}{3}$ in.; bracts 2–4, ovate or oblong, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Calyx-tube shaggy, short; lobes linear, $\frac{1}{4}$–$\frac{3}{8}$ in. long, spreading, persistent, glabrous inside. Corolla lobes short, shaggy outside, glabrous inside, ovary 5-celled. Fruit $\frac{1}{8}$ in. diam.

Upper Guinea. Sierra Leone, *Th. Vogel! Barter! Afzelius! Smeathman!*
Var. **villosior.** Benth. l. c. p. 399. More hairy; flower heads subsessile.
Upper Guinea. Sierra Leone, *G. Don!* (flowers white.)

5. **S. capitellata,** *Benth. in Hook. Niger Fl.* p. 398. A climbing shrub of 12–15 ft. Leaves oval, shortly acuminate, rounded or wedge-shaped and somewhat oblique at the base, subglabrescent above except puberulous midrib, pale and shortly cottony beneath with appressedly

hairy veins, $1\frac{1}{2}$–$6\frac{1}{2}$ by $\frac{3}{4}$–$3\frac{1}{2}$ in., or the upper ones smaller; lateral veins 12–16 on each side of the midrib; petioles ranging up to $2\frac{1}{2}$ in.; stipules shortly oval, $\frac{1}{6}$–$\frac{1}{4}$ in. long. Flowers pentamerous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, subsessile, several together in pedunculate globose or hemispherical compact cymes of $\frac{1}{3}$–$\frac{2}{3}$ in. diam.; peduncles ranging up to $\frac{1}{2}$ in., axillary and terminal; bracts broadly oval or ovate, involucrate. Calyx-tube densely pilose; lobes lanceolate or linear-lanceolate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, spreading glabrous inside. Corolla rather slender; tube glabrous below, appressedly hairy above; teeth ovate-lanceolate, short, hairy outside. Anthers inserted at the throat of the corolla. Style 5-cleft at apex. Fruit pisiform, shaggy, 5-celled.

Upper Guinea. Fernando Po, *Th. Vogel!* (buds whitish, tipped with rose), *Mann!* (flowers brownish); Cameroon River, *Mann!*

Lower Guinea. Congo, *Chr. Smith!*

6. **S. venosa,** *Benth. in Hook. Niger Fl.* p. 399. A rambling shrub with terete glabrescent branches. Leaves ovate-elliptical, acutely acuminate, suboblique and obtuse at the base, more or less hairy on both sides, not tomentose, 2–4 by $\frac{3}{4}$–$1\frac{3}{4}$ in.; lateral veins 12–18 on each side of the midrib; petiole ranging up to $\frac{2}{3}$ in.; stipules ovate, $\frac{1}{5}$–$\frac{1}{4}$ in. Flowers tetramerous or pentamerous, $\frac{1}{3}$–$\frac{1}{2}$ in. long, very shortly pedicellate, several together in very shortly pedunculate subglobose axillary cymes $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; bracts lanceolate-oblong, $\frac{1}{6}$–$\frac{1}{5}$ in., not involucrate. Calyx-tube pilose campanulate-oblong and $\frac{1}{10}$ in. long in flower, globose in fruit; lobes ovate-oblong, about equalling the tube or rather longer, especially in fruit. Corolla pilose outside; lobes lanceolate, short. Fruit 4-5-celled, $\frac{1}{8}$ in. diam.—*Virecta lutea*, G. Don, Gen. Syst. iii. 521, ? ex Benth. *l. c.* (flowers yellow).

Upper Guinea. Senegambia, *Heudelot!* Sierra Leone, *G. Don! Afzelius!*

7. **S.? segregata,** *Hiern.* A climbing shrub, 15 ft. high, with terete appressedly pubescent branches. Leaves ovate-oval, acuminate, excavated or rounded at the base, subglabrous above except the pubescent midrib, glabrescent below except the pilose-pubescent veins, ranging up to 6 by $2\frac{3}{4}$ in.; petiole up to $\frac{3}{4}$ in., pubescent; lateral veins 12–16 on each side of the midrib; stipules ovate, acute, $\frac{1}{3}$ in. long, glabrous or nearly so. Flowers about $\frac{1}{4}$ in. long, shortly pedicellate, pentamerous, in axillary branching bracteate paniculate, not capitate, pubescent cymes of 1–$2\frac{1}{2}$ in. long; bracts oval or oblong, not involucrate. Calyx pubescent; lobes oval-oblong or sublinear, $\frac{1}{2}$–$\frac{1}{6}$ in. long. Corolla puberulous outside; lobes ovate, glabrous inside. Stamens inserted at the throat of the corolla. Ovary 2-celled. Fruit 2-celled.

Upper Guinea. Muni River, 1° N. lat., *Mann!*

8. **S.? cauliflora,** *Hiern.* A more or less pubescent (erect shrub). Branches obtusely angular above or terete below. Leaves oval or obovate, shortly acuminate, attenuate at the base, ranging up to 17 by 7 in.; petiole to $1\frac{1}{4}$ in.; lateral veins 19–23 on each side of the midrib, slender; stipules ovate, 1–$1\frac{1}{4}$ in. long. Flowers 5–6-

merous, shortly pedicellate, many together in lateral abbreviated puberulous cymes, $\frac{3}{4}$–1 in. diam. Calyx-limb shortly tubular with linear or lanceolate lobes $\frac{1}{8}$–$\frac{1}{6}$ in. long. Corolla hairy in the bud. Ovary 2-celled.

Upper Guinea. Gaboon River, *Mann!* St. Thomas Island, *Mann!*

9. **S.? geantha,** *Hiern.* A nearly glabrous (erect) shrub, 10 ft. high. Leaves oval, acuminate at both ends, glossy above, ranging up to 12 by $5\frac{1}{2}$ in.; petiole to $1\frac{1}{2}$ in.; lateral veins 20–27 on each side of the midrib, rather slender; stipules ovate, acute, 1–$1\frac{1}{2}$ in. long. Flowers shortly pedicellate, pentamerous, about 1 in. long, slender, many together in subglobose lateral puberulous cymes, 1–2 in. diam., near the ground. Calyx-limb shortly tubular, with linear-filiform lobes about $\frac{1}{6}$ in. long. Corolla narrowly tubular, glabrous; lobes ovate, obtuse. Ovary 2-celled; style bilamellate.

Upper Guinea. Sierra del Crystal, 1° N. lat., *Mann!*

19. TEMNOPTERYX, Hook. f. in Benth. et Hook. f. Gen. Pl. ii. 72.

Calyx-tube campanulate in flower, globose in fruit; limb 5-partite, segments more or less unequal, at first subulate, some or all more or less early produced into dilated foliaceous petiolate lobes, persistent. Corolla tubular-funnel-shaped, scarcely membranous, silky on both sides; throat rigidly bearded; limb 5-lobed; lobes ovate, valvate in æstivation. Stamens 5, inserted about the middle of the corolla; anthers linear; filaments short. Disk annular, inconspicuous. Ovary 5-celled; style cleft into 5 linear lobes; ovules very numerous, inserted on thick placentas. Fruit subglobose, truncate or depressed at the apex, coriaceous, with 5 longitudinal furrows, 5-celled; dissepiments thin; seeds numerous.—A monotypic genus, with opposite petiolate leaves, multifid ample interpetiolar stipules, and rather large flowers clustered in dense axillary cymes, which are each sheathed by a basal bract.

1. **T. sericea,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* ii. p. 72. A sturdy herb, 2–3 ft. high, covered on the short lower side of leaves (at least on the veins) and flowers with rufous shining silky hairs. Leaves oblanceolate, 5–14 by 2–$3\frac{1}{2}$ in., caudate-acuminate, attenuate at the base; petiole $\frac{1}{2}$–2 in.; lateral veins about 10–16 pairs; stipules about 1 in. long, lobes subulate. Flowers about $\frac{3}{4}$–1 in. long, many together, sessile or subsessile, in a pedunculate head, enclosed at the base by a membranous coloured? campanulate plurifid bract of $\frac{1}{2}$–$\frac{2}{3}$ in.; bracteoles lanceolate or subulate. Lamina of the enlarged calyx-lobes cuspidate varying from orbicular to oval or oblong, ranging up to 1 in. Fruit $\frac{1}{2}$–$\frac{2}{3}$ in. diam.

Upper Guinea. Sierra del Crystal, 1° N. lat., *Mann!*

20. **PENTALONCHA**, Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 73.

Calyx-tube campanulate in flower, globose in fruit; limb 5-partite, segments more or less equal, all developed more or less into petiolate elliptical acuminate foliaceous, persistent lobes. Corolla tubular, somewhat funnel-shaped, submembranous, puberulous outside, shaggy inside; throat bearded; limb 5-lobed; lobes ovate-lanceolate, valvate in æstivation. Stamens 5, inserted about the middle of the corolla-tube; anthers linear-oblong, sessile. Disk hemispherical. Ovary 5-celled; style filiform, included, "with 2 linear little-dilated erect hirsute branches" (Hook. f.); ovules very numerous, inserted on tumid placentas. Fruit subglobose, subtruncate at the apex, 5-celled; dissepiments thin; seeds numerous.—A monotypic genus with opposite petiolate leaves, entire or cleft lanceolate interpetiolar stipules, and rather small flowers clustered in dense axillary not involucrate cymes.

This genus as well as the previous one may perhaps be reducible to the Ceylon genus *Schizostigma*, Arn.

1. **P. humilis,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* ii. p. 73. A nearly glabrous decumbent herb, about a foot long; stem somewhat wiry and compressed.. Leaves obovate, cuspidate, attenuate at the base, 3–6 by $1\frac{1}{2}$–$2\frac{3}{5}$ in.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; lateral veins about 8–10 pairs; stipules acute, about $\frac{1}{2}$ in. long. Flowers about $\frac{1}{3}$ in. long, shortly pedicellate, many together in very shortly pedunculate axillary cymes. Lamina of the calyx-lobes not exceeding $\frac{1}{10}$ in. Corolla white. Fruit about $\frac{1}{10}$ in. diam.

Upper Guinea. Sierra del Crystal, 1° N. lat., *Mann!*

21. **STIPULARIA,** P. de Beauv.; Benth. et Hook. f. Gen. Pl. ii. p. 74.

Calyx-tube oblong in flower, oval in fruit, more or less compressed; limb deeply and unequally 5–6-lobed, glabrous or silky outside; throat pubescent; lobes ovate, obtuse, valvate in æstivation. Anthers 5, sessile, inserted about the middle of the corolla-tube, linear, glabrous, included. Disk shortly tubular, truncate. Ovary 3- or 5-celled; style slender, 3- or 5-cleft; branches linear; ovules numerous in each cell; dissepiments thin. Berry many-seeded. Seeds small, angular.—A genus confined to this flora, consisting of somewhat cottony or hispid or silky erect shrubs, with opposite petiolate leaves, entire interpetiolar stipules, and slender bracteolate flowers clustered in subsessile axillary solitary heads, which are enclosed in one or two campanulate or connate involucral bracts.

Leaves paler beneath. Involucre cup-shaped. Corolla glabrous outside.	
Stipules ovate, 1–1¼ in. long; bracteoles some equalling the flowers or nearly so	1. *S. africana.*
Stipules ovate-lanceolate, ¼–½ in. long; bracteoles very small	2. *S. elliptica.*
Leaves pale on both surfaces. Involucral bracts connate at the base. Corolla densely silky outside	3. *S. gabonica.*

1. **S. africana,** *P. de Beauv. Fl. d'Ow.* ii. 26, t. 75 (1807). A shrub, 6 ft. high, hispid at the extremities of the obtusely quadrangular shoots and margins of petioles. Leaves oval-obovate, sub-cuspidate, wedge-shaped at the base, glabrate above except midrib, pale yellowish and obsoletely tomentose beneath, 5–11 by 2–4 in.; petiole $\frac{2}{3}$–1 in.; lateral veins 17–22 on each side of the midrib; stipules ovate, 1–$1\frac{1}{4}$ in. long. Involucre nearly equalling the stipules, sessile, unequally 4–5-cleft or toothed, angular and subplicate; bracteoles oval-oblong, equalling or shorter than the flowers, ciliate. Flowers several together, subsessile, rather shorter than the involucre, slender, dirty yellow (according to P. de Beauvois). Calyx scarcely half the length of the flower. Corolla glabrous outside. Style-branches 3; ovary 3-celled.

Upper Guinea. Oware and Galbar, *P. de Beauvois;* Bagroo River, *Mann!;* Corisco Island, 1° N. lat., *Mann!*

Grows in swampy ground or by rivers.

2. **S. elliptica,** *Schweinf. mss. in Herb.* A small shrub, 4–5 ft. high, somewhat cottony at the extremities of the obtusely quadrangular branches and outside the involucres. Leaves elliptical, apiculate, wedge-shaped or obtuse at the base, glabrate above, paler and cottony-subtomentose beneath, $2\frac{1}{2}$–8 by 1–$4\frac{1}{2}$ in.; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., pubescent or glabrescent; lateral veins 10–14 on each side of the midrib; stipules ovate-lanceolate, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Involucre 1–$1\frac{1}{4}$ in. long or nearly so, red or purple inside, shortly and unequally 3–5-cleft, subsessile or, with common peduncle, ranging up to $\frac{1}{3}$ in.; bracteoles very short, hairy. Flowers many together, shorter than the involucres, sessile, white. Calyx less than half the length of the flowers. Corolla glabrous outside. Style-branches 5; ovary 5-celled. Berry 5-celled, compressed, $\frac{1}{4}$ in. broad.

Upper Guinea. Niger, Onitsha, *Barter!*

Nile Land. Niamniam-land, *Schweinfurth!*

3. **S. gabonica,** *Hiern.* A climbing shrub, appressedly but inconspicuously pubescent towards the extremities, of a pale yellowish green colour. Leaves oval, acute or acuminate at both ends, hairy along the margin, 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; petiole $\frac{3}{4}$–$2\frac{1}{2}$ in., appressedly pubescent; stipules lanceolate, $\frac{1}{2}$ in. long, appressedly pubescent outside. Flowers $\frac{2}{3}$–$\frac{3}{4}$ in long, on short pedicels, many together, crowded in hemispherical shortly pedunculate axillary subterminal heads of about $1\frac{1}{2}$ in. diam.; common peduncle about $\frac{1}{4}$ in. long, appressedly pubescent; involucral bracts broadly ovate, $\frac{3}{4}$–1 in. long, puberulous. Calyx-limb narrowly tubular, $\frac{1}{2}$–$\frac{2}{3}$ in. long, appressedly pubescent, unequally 5-cleft; lobes linear-lanceolate. Corolla densely silky outside, shortly exceeding the calyx-limb; lobes 5, short, valvate in æstivation. Ovary 5-celled; ovules numerous, small.

Upper Guinea. Gaboon River, *Mann!*

22. HEINSIA, DC.; Benth. et Hook. f. Gen. Pl. ii. p. 77.

Calyx-tube campanulate or oblong in flower, globular in fruit; limb 5-partite, persistent; lobes enlarged, more or less oval or oblong,

longer than the tube, subfoliaceous. Corolla salver-shaped; tube slender silky outside; throat densely bearded; limb spreading, unequally 5–6-lobed, large, imbricated in æstivation. Stamens 5–6, inserted on the throat of the corolla, included; anthers linear; filaments short. Disk small, tumid. Ovary 2-celled; style rather slender; branches 2, shortly linear; cells many-ovuled. Fruit dry, indehiscent, many-seeded. Seeds small, roundly angular; testa pale, crustaceous, foveolate; albumen fleshy; embryo clavate.—An endemic genus, consisting of erect or decumbent shrubs with opposite shortly petiolate leaves, small subulate or larger and ovate stipules, and rather large white flowers, solitary, few, or many together in terminal and lateral cymes.

Stipules small, subulate, two together.
- Glabrous or puberulous. Flowers solitary or in lax cymes . . . . . 1. *H. jasminiflora.*
- Hirsute-hispid. Flowers in dense cymes . . . . . 2. *H. densiflora.*

Stipules rather large, ovate or lanceolate, solitary . . . 3. *H. benguelensis.*

1. **H. jasminiflora,** *DC. Prodr.* iv. 390. An erect shrub, 6–15 feet high, sometimes subarborescent, glabrous or puberulous. Branches terete, green when young, soon turning brown. Leaves elliptical, more or less acuminate, wedge-shaped or obtuse at the base, shortly petiolate, 1–4 by $\frac{1}{3}$–$1\frac{3}{4}$ in. or occasionally smaller; lateral veins 4 or 5 on each side of the midrib; stipules two together, subulate or lanceolate-subulate, $\frac{1}{6}$ in. long or shorter, caducous. Flowers fragrant, several together or solitary in lax terminal cymes; pedicels rather short or ranging up to $1\frac{1}{2}$ in. Calyx-lobes oval oblong or spathulate, obtuse or acute, attenuate at base, green, $\frac{1}{4}$–$\frac{2}{3}$ in. long. Corolla-tube appressedly pubescent, $\frac{2}{3}$–1 in. long, green; limb very variable in size, $\frac{3}{4}$–$2\frac{1}{2}$ in. diameter, pubescent with yellow hairs, white; lobes acuminate or obtuse, margins usually crisped; throat bearded with yellow hairs. Berry $\frac{1}{3}$–$\frac{1}{2}$ in. diameter.—Bot. Mag. t. 4207; *Gardenia crinita*, Afzel.! Stirp. Guin. Medic. Sp. Nov. p. 13, n. 5 (1829); *? H. pubescens*, Klotzsch, Schoenl. Bot. Nachl. Palmas, p. 228 (1857); *G. pulchella*, G. Don in Edinb. Phil. Journ. xi. p. 343 (1824).

Upper Guinea. Sierra Leone, *Smeathman!* and other collectors, ? Cape Palmas, *Schoenlein;* Fernando Po, *Th. Vogel! Barter! Mann!* Prince's Island, *Barter!*

Lower Guinea. Loango, *Soyaux!*

Mozamb. Distr. Zambesia, R. Shire, *Kirk!* Quilimane, *Kirk!* Bagomojo, Zanzibar coast, *Kirk! Hildebrandt!* Moramballa, *Kirk!* Rovuma River, *Kirk!* Dar Salam, stunted form, *Kirk!*

2. **H. densiflora,** *Hiern.* A hirsute-hispid shrub, with tawny or ferruginous hairs. Leaves elliptical, acutely acuminate, rounded or the uppermost narrowed at the base, sparingly hispid above, more densely hairy beneath, 3–6 by 1–2 in.; lateral veins 7–10 on each side of the midrib, inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules two together, filiform-subulate, $\frac{1}{4}$–$\frac{1}{2}$ in. Flowers about 1–$1\frac{1}{4}$ in. long, sessile, many together, in short dense terminal and lateral cymes. Calyx-lobes oval-spathulate, $\frac{3}{8}$–$\frac{5}{8}$ in. long. Corolla-tube densely pubescent outside, very densely bearded within with yellow hairs; limb $1\frac{1}{4}$–$1\frac{3}{4}$ in. diameter; lobes caudate-acuminate.

Mozamb. Distr. Zanzibar, *Kirk!*

8. **H. benguelensis,** *Welw. ex Benth. et Hook. f. Gen. Pl.* ii. p. 77. A dwarf evergreen shrub, half a foot high; radical branches several, woody, decumbent or prostrate-ascending, rigid, glabrate below, shortly pubescent and leafy towards the tip. Leaves narrowly elliptical, obtusely pointed at the apex, attenuate at the shortly petiolate base, thinly coriaceous, rigid, glabrate or softly puberulous above, glabrescent or shortly pubescent along the veins or puberulous beneath, 1–1¾ by ¼–⅔ in.; lateral veins about 5 pairs, not conspicuous, margins revolute; stipules solitary, ovate or lanceolate, undivided, persistent, keeled, puberulous or glabrate, ⅕–⅖ in. long, about double the length of the petiole. Flowers 1¼–1½ in. long (when open), terminal, solitary or two together, sessile, fragrant. Calyx ⅝–⅞ in. long; tube turbinate, shortly and closely hairy; lobes 5, narrowly oval-oblong, ½–⅔ in. long, foliaceous. Corolla white; tube 1–1¼ in. long, shortly and appressedly hairy outside; throat hairy; lobes 5–6, imbricated, oval, ½–1 in. long, glabrous inside, puberulous outside. Anthers included, ⅜–½ in. long, shortly apiculate, base obtuse. Style pubescent, equalling the corolla-tube; branches 2, obtuse.

Lower Guinea. Benguela, sporadic in stony sandy thickets between Mumpulla and Humpata, in flower, November 1859, *Welwitsch!*

23. **BERTIERA,** Aubl.; Benth. et Hook. f. Gen. Pl. ii. p. 77.

Calyx-tube short, campanulate in flower, subglobose in fruit; limb produced above the ovary, cup-shaped, usually broader than the inferior part in flower, narrower in fruit, 5-toothed (deeply 5-lobed in *B. breviflora*), persistent. Corolla tubular, much exceeding the calyx (campanulate and double the length of the calyx in *B. breviflora*); limb rather elongated (except *B. breviflora*), 5–4-cleft; lobes usually acuminate or apiculate, dextrorsely contorted in æstivation (as seen inside) or in *B. breviflora* sometimes imbricated. Anthers 5–4, usually linear, sagittate or bi-lobed at the base, basifixed, included; filaments inserted usually at the hairy throat of the corolla (except *B. laxa*), very short. Disk cup-shaped cushion-shaped or annular. Ovary 2-celled; style more or less club-shaped, glabrous; branches 2, flattened, appressed; ovules numerous, inserted on the tumid placentas. Fruit indehiscent, usually globose, pisiform, coriaceous, 2-celled, usually marked with about 10 slender ribs from the apex downwards. Seeds numerous, angular.—Shrubs with opposite shortly petiolate thin scarcely coriaceous leaves, persistent stipules usually sheathing at the base, and flowers of moderate size, rarely very small, sessile or shortly pedicellate, in spicate thyrsoid panicled or scorpioid terminal cymes.

A genus of several species inhabiting also the Mascarene Islands and Tropical America.

Cymes spicate or thyrsoid or oblong. Corolla-tube cylindrical, much exceeding the calyx. Calyx-teeth small.
Branches of the oblong cyme obsolete or short.
Bracteoles small, falling short of the fruit.
Leaves more or less narrowed at the base.
Fruit somewhat hairy.
Leaves sub-acuminate, distinctly but shortly petiolate . . . . . 1. *B. æthiopica.*

Leaves much acuminate, subsessile	2. *B. subsessilis.*
Fruit quite glabrous	3. *B. montana.*
Leaves mostly subcordate at the base.	
Pilose-hispid	4. *B. africana.*
Nearly glabrous	5. *B. macrocarpa.*
Bracteoles filiform, nearly equalling the fruit . . .	6. *B. bracteolata.*
Branches of the ample cyme of moderate length . . .	7. *B. laxa.*
Cymes with elongate divaricate branches. Corolla-tube campanulate, short. Calyx deeply lobed	8. *B. breviflora.*

1. **B. æthiopica,** *Hiern.* A pubescent shrub, with terete rather slender branchlets. Leaves elliptical or elliptic-oblong, subacuminate, subobtusely narrowed at the base, appressedly puberulous or glabrate above, shortly and appressedly pubescent especially on the veins beneath, ciliolate, 3–6 by $1\frac{1}{5}$–$1\frac{2}{3}$ in.; petiole $\frac{1}{8}$–$\frac{1}{5}$ in.; lateral veins 7–8 on each side of the midrib; stipules lanceolate, acute, appressedly and shortly pubescent, scarcely connate at the base, about $\frac{3}{8}$ in. long. Flowers . . . . Bracteoles filiform, $\frac{1}{15}$ in. Berry subglobose, $\frac{1}{6}$–$\frac{1}{5}$ in. diameter, shortly pubescent, crowned by the short 5-toothed calyx-limb, bluish grey, sessile, in clusters along the drooping pubescent spicate shortly pedunculate cymes which measure 4–6 in. Seeds angular.

Mlle Land. Niamniam-land, *Schweinfurth!*

2. **B. subsessilis,** *Hiern.* A shrub with appressedly pubescent branchlets. Leaves elliptic-oblong, much acuminate, wedge-shaped at the base, glabrate above, shortly pubescent at least on the veins beneath, 3–$5\frac{1}{4}$ by 1–$1\frac{1}{2}$ in., subsessile; lateral veins about 8 on each side of the midrib; stipules shortly tubular, $\frac{1}{3}$–$\frac{1}{2}$ in. long, erect, glabrate, free portions lanceolate. Flowers white, pale-silky, about $\frac{1}{2}$ in. long in bud, sessile, in clusters along the terminal spikes. Bracteoles subulate or ovate, caducous, small. Calyx $\frac{1}{8}$ in. long; limb 5-dentate. Corolla tubular; limb 5-cleft, hairy inside below; lobes ovate-lanceolate, dextrorsely contorted in the bud (as seen inside). Anthers linear, apiculate, subsessile, inserted at the throat of the corolla. Style filiform-clavate; branches linear, obtuse, compressed, sulcate. Berry more or less hairy, subglobose, $\frac{1}{5}$–$\frac{1}{4}$ in. diameter, tipped by the persistent calyx-limb. Seeds (immature ?) compressed, angular.

Upper Guinea. Niger Expedition, at Brass, *Barter!*

3. **B. montana,** *Hiern.* A smooth glabrescent shrub, 20 feet high. Shoots appressedly pubescent. Leaves oval-oblong shortly acuminate, obtusely narrowed at the base, 5–9 by $1\frac{1}{2}$–$3\frac{1}{3}$ in.; margins obsoletely ciliate; lateral veins 6–8 on each side of the midrib; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules half sheathing, $\frac{3}{4}$ in. long, puberulous outside; free portion ovate-lanceolate. Flowers $\frac{1}{2}$–$\frac{2}{3}$ in. long, subsessile, pendulous, in clusters on the oblong crowded pedunculate (erect) cymes. Bracteoles minute. Calyx green, glabrate; limb hemispherical, broader than the lower part, very shortly 5-toothed, $\frac{1}{8}$ in. diameter. Corolla white, appressedly hairy outside; tube slender; limb 5-lobed, hairy inside; lobes lanceolate, acuminate, glabrous.

Upper Guinea. Fernando Po Island, *Mann!*, altitude 7000 feet.

4. **B. africana,** *A. Rich. in Mém. Soc. Hist. Nat. Par.* v. p. 255 (1834). A shrub of 5 or 6 feet. Branches pilose-hispid, at length glabrate. Leaves ovate-lanceolate, more or less acuminate, rounded or subcordate at the base, pubescent or glabrescent above, paler and more pubescent at least on the veins beneath, 6–9 by $1\frac{3}{4}$–$3\frac{1}{2}$ in.; lateral veins 8–12 on each side of the midrib, pubescent; petiole $\frac{1}{8}$–$\frac{3}{8}$ in.; stipules about 1–$1\frac{1}{3}$ in. long or rather more, long-sheathing, free parts lanceolate. Flowers $\frac{1}{3}$ in. long or more, slender, subsessile, several together, in fascicles along elongated terminal spikes 4–8 in. long. Bracteoles small. Calyx very small in flower, 5-toothed; teeth shorter than the disk, obtuse. Corolla-limb 5-fid, hairy inside; lobes ovate, pointed, dextrorsely contorted. Anthers inserted at the top of the corolla-throat. Style filiform-clavate, glabrous; branches 2, compressed, lanceolate-oblong. Berry subglobose, $\frac{1}{5}$ in. diameter, marked with two shallow longitudinal furrows.—*Pomatium spicatum,* Gærtn. f. Carp. iii. p. 252, t. 225, f. 10; *B. Pomatium,* Benth. in Hook. Niger Fl. p. 394; *Genipa labiata,* Smeathm. in Hb. Mus. Brit., and ex DC. Prodr. iv. p. 391; *Wendlandia pilosa,* G. Don, Gen. Syst. iii. p. 519.

Upper Guinea. Sierra Leone, *Smeathman! Th. Vogel! G. Don!* Senegambia, *Perrottet and Leprieur, Heudelot!*

5. **B. macrocarpa,** *Benth. in Hook. Niger Fl.* p. 394. A nearly glabrous shrub or appressedly pubescent on the branchlets veins of leaves and inflorescence. Leaves oval-oblong, acuminate, usually subcordate at the base, 4–13 by $1\frac{1}{6}$–$4\frac{3}{4}$ in.; lateral veins 8–11 on each side of the midrib; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules $\frac{3}{4}$–$1\frac{1}{8}$ in. long, connate at the base, ovate-lanceolate. Flowers greenish or white, $\frac{1}{2}$–$\frac{5}{8}$ in. long, shortly pedicellate in thyrsoid oblong pedunculate at length drooping cymes. Bracteoles ovate, small. Calyx-limb hemispherical, wider than the lower part, 5-toothed, glabrescent, $\frac{1}{8}$–$\frac{1}{6}$ in. diameter. Corolla-tube puberulous, rather thick; limb 4–5-lobed, pubescent inside; lobes ovate-acuminate, dextrorsely contorted in the bud. Anthers subsessile, obtusely sagittate at the base. Berry globose or ellipsoidal, $\frac{1}{4}$–$\frac{3}{8}$ in. diameter, crowned by the persistent calyx-limb. Seeds angular, compressed.—*Wendlandia racemosa,* G. Don, Gen. Syst. iii. p. 519.

Upper Guinea. Prince's Island, *Barter! Mann! Welwitsch!* Niger Expedition, at Brass, *Barter!*; Old Calabar, *Rev. W. C. Thomson!* Sierra Leone, leaves not cordate, *G. Don!*

6. **B. bracteolata,** *Hiern.* Puberulous, shrubby. Branches patent, reddish brown, terete. Leaves oval, subacuminate, cuspidate, rounded at the base, 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., shortly pubescent on the petiole and veins beneath; lateral veins about 5–6 on each side of the midrib; petiole $\frac{1}{8}$–$\frac{1}{5}$ in.; stipules connate and shortly sheathing, appressedly pubescent or puberulous, about $\frac{1}{4}$ in. long, ovate-lanceolate. Flowers sessile or shortly pedicellate on the short patent lateral branches of the oblong thyrsoid pedunculate cymes which measure about 3–5 in. long; bracteoles lanceolate and filiform, at the base of the calyx, exceeding it in flower, about equalling the fruit; bracts at the base of the primary branches of the cyme filiform, $\frac{1}{8}$–$\frac{3}{8}$ in. long. Calyx small, shortly

5-toothed, persistent; teeth ovate, pointed. Corolla acutely pointed in the bud. Disk cup-shaped, equalling the calyx, subtruncate, obscurely 5-lobed. Fruit depresso-globose, $\frac{1}{8}$ in. diameter, marked faintly with about 9–10 longitudinal ribs, glabrate. Seeds angular, small.

Upper Guinea. Sierra Leone, *Afzelius!*

7. **B. laxa,** *Benth. in Hook. Niger Fl.* p. 394. A puberulous or glabrescent shrub, 12–15 feet high. Leaves oval-oblong, acutely acuminate, wedge-shaped at the base, $1\frac{1}{2}$–8 by $\frac{3}{4}$–$2\frac{1}{2}$ in.; lateral veins 6–10 on each side of the midrib, slender; petiole $\frac{1}{8}$–$\frac{1}{2}$ in.; stipules very shortly sheathing, $\frac{3}{4}$–1 in. long, free portion ovate-lanceolate. Flowers $\frac{3}{4}$ in. long, slender, shortly and appressedly hairy, green, sessile or subsessile, in divaricately branched lax terminal pedunculate cymes $3\frac{1}{2}$–7 in. long; bracts subulate, recurving; bracteoles small. Calyx $\frac{1}{10}$ in. long; limb 5-toothed, persistent at the apex of the fruit; teeth deltoid, rather acutely pointed. Corolla-limb elongated, glabrous inside, 5-fid; lobes acutely acuminate, dextrorsely contorted. Anthers linear-oblong, acute, acutely sagittate at base; filaments short slender inserted at bottom of corolla-limb. Style somewhat clavate, glabrous; branches compressed, linear-oblong. Berry $\frac{1}{6}$ in. diameter, feebly ribbed.

Upper Guinea. Fernando Po, *Th. Vogel! Mann!* Sierra Leone, *Smeathman!* in fruit and *Afzelius!* in flower (small-leaved and apparently subscandent forms with less acute corolla-buds).

Var.? *pedicellata.* A laxer attenuated form having lanceolate-oblong leaves, stipules $\frac{1}{3}$–$\frac{1}{2}$ in. long with lanceolate-acuminate apex, and pedicellate flowers.

Upper Guinea. St. Thomas Island, at the summit of the peak, *Mann!*

A specimen fr m Lower Guinea, Congo, collected by Chr. Smith, in young flower, appears to belong to *Bertiera laxa,* Benth.

Wendlandia sulcata, G. Don, Gen. Syst. iii. p. 519, from Sierra Leone in woods on the banks of rivers, is unknown to me; perhaps it may belong to this species.

8. **B. breviflora,** *Hiern.* A small shrub with appressedly pubescent branches. Leaves elliptical, acuminate, rounded or wedge-shaped at the base, glabrescent above, pubescent beneath at least on the veins, $2\frac{1}{2}$–5 by $\frac{3}{4}$–$2\frac{1}{4}$ in.; lateral veins about 6 on each side of the midrib; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules shortly tubular, glabrous inside, $\frac{1}{2}$–$\frac{3}{4}$ in.; free portion ovate. Flowers about $\frac{1}{6}$ in. long, sessile, pubescent, unilateral on the divaricate branches of the terminal cymes which measure 3–5 in. broad. Bracteoles lanceolate, obtuse, nearly equalling the calyx. Calyx half the length of the flower, larger in fruit; limb deeply lobed, persistent; lobes lanceolate or oblong, about equalling the ovary. Corolla campanulate, 5-lobed; lobes $\frac{1}{2}$ the length of the tube, obtuse, dextrorsely contorted or sometimes imbricated in the bud as regarded from inside; throat hairy. Berry subglobose, $\frac{1}{3}$ in. diam. Seeds angular.

Upper Guinea. Niger Expedition, at Eppah, *Barter!* Gaboon River, *Mann!*

24. DICTYANDRA, Welw. ex Benth. et Hook. f. Gen. Pl. ii. p. 85.

Calyx-tube turbinate or oblong in flower, subglobose in fruit; limb deeply 5-lobed, with a few short erect fleshy setæ at base; lobes equal,

ovate, contorted dextrorsely (as seen from inside), persistent. Corolla silky outside; tube funnel-shaped; throat glabrous or somewhat hairy; lobes 5, ovate or oblong-lanceolate, longer than the tube, imbricated dextrorsely in bud. Stamens 5, inserted on the throat of the corolla; anthers sessile, linear-tapering, exserted, glabrous; connective mucronate; cells introrse, divided into small compartments by longitudinal and many transverse septa. Disk columnar, truncate. Ovary 2-celled; style stout or filiform, tomentose or glabrous, with 2 spreading or erect linear or subulate branches; ovules numerous, inserted in many rows on the placentas. Berry subglobose, fleshy, 2-celled, many-seeded. Seeds not very small, somewhat compressed and obtusely angular; testa dark, shining; albumen horny, oily, &c.—Trees or shrubs with opposite petiolate glossy, submembranous leaves, wide rounded or acuminate or cuspidate persistent stipules, and rather large flowers in terminal cymes which often terminate short axillary branches.

An endemic genus.

Cymes pedunculate. Flower $1\frac{1}{4}$–$1\frac{1}{2}$ in. long. Calyx-lobes broadly ovate. Style exserted, tomentose . . . . . 1. *D. arborescens.*

Cymes sessile. Flowers 3–4 in. long. Calyx-lobes ovate or lanceolate. Style included, glabrous . . . . . 2. *D. involucrata.*

1. **D. arborescens,** *Welw. mss. ex Benth. et Hook. f. Gen. Pl.* ii. p. 85. An arborescent or stout shrub, 8–25 ft. high, nearly glabrous. Branches opposite, spreading, elongated, leafy, obtusely and unequally 4-sided or nearly terete below. Leaves oval, shortly acuminate, wedge-shaped at the base, firmly chartaceous, 5–10 by 2–4 in., dark green on both sides, persistent; lateral veins about 7–9 on each side of the midrib, slender; petiole $\frac{1}{4}$–1 in.; stipules ovate, apiculate, $\frac{1}{4}$–$\frac{1}{2}$ in. long, ciliolate, erect. Flowers yellow-greenish, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, coriaceously rigid, sessile or shortly pedicellate, in trichotomous corymbose cymes. Calyx herbaceous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; tube shortly pubescent; lobes broadly ovate, ciliolate or glabrate, longer than the tube. Corolla silvery outside; lobes acute or apiculate, $\frac{2}{3}$–$\frac{4}{5}$ in. long. Anthers nearly $\frac{1}{2}$ in. long. Style exserted, tomentose-pubescent. Berry $\frac{3}{8}$ in. diam. or more. Seeds quite black, glistening.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

Lower Guinea. Angola, Golungo Alto, 2500–2800 ft. alt., in wooded slopes of Serra de Alto Queta, *Welwitsch!*

2. **D. involucrata,** *Hiern.* A nearly glabrous shrub, 15–20 ft. high; branchlets obtusely quadrangular. Leaves elliptic-obovate, acutely acuminate, wedge-shaped at the base, 4–10 by 2–5 in.; margins flat; lateral veins 9–12 on each side of the midrib; petiole $\frac{1}{3}$–1 in.; stipules rotund, reflexed, concave, $\frac{1}{2}$–$\frac{5}{8}$ in. diam. Flowers 3–4 in. long, on short pedicels little narrower than the calyx, clustered in sessile cymes terminal and terminating short axillary branches; bracteoles oblong or linear, fugacious. Calyx $\frac{1}{8}$–$\frac{1}{6}$ in. long, puberulous, obscurely ribbed; lobes lanceolate, subfoliaceous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, subacute. Corolla-lobes ovate or lanceolate, subobtuse, $\frac{2}{3}$–1 in. long. Anthers half exserted. Style glabrous, half as long as the corolla-tube.—*Leptactina involucrata,* Hook. f. Ic. Pl. sub. t. 1092.

Upper Guinea. Ambas Bay, 1° N. lat. *Mann!*

25. **LEPTACTINA,** Hook. f.; Benth. et Hook. f. Gen. Pl. ii. p. 85 (Leptactinia).

Calyx-tube oblong or campanulate, equalling the ovary; limb 5-partite, with short erect fleshy setæ at base; lobes equal, elongated, foliaceous or somewhat so, contorted dextrorsely (as seen from within) in bud, persistent. Corolla salver-shaped; tube slender, elongated, silky outside; limb 5-partite; throat more or less hairy; lobes elongated, subequal, contorted dextrorsely in bud. Stamens 5; anthers sessile, narrowly linear, glabrous, included or partly exserted, inserted by the middle at the throat of the corolla. Disk fleshy. Ovary 2-celled; style filiform, bifid at apex; ovules numerous, sessile, peltately attached to the fleshy placentas. Fruit ovoid, 2-celled; cells many-seeded. Seeds angular, closely packed together.—Glabrous or puberulous erect branched leafy shrubs of some size, with opposite chartaceous glossy leaves, rather large broad ovate stipules and large hermaphrodite flowers in dense terminal sessile or subsessile cymes.

An endemic genus.

Stipules much concave, doubled back. Flowers 4–6 in. long — 1. *L. Mannii.*
Stipules nearly flat, erect. Flowers $1\frac{1}{2}$–3 in long.
  Style glabrous or puberulous above.
    Leaves petiolate. Style included . . . . . 2. *L. densiflora.*
    Leaves subsessile. Style much exserted . . . . . 3. *L. senegambica.*
  Style hirsute above . . . . . 4. *L. heinsioides.*

1. **L. Mannii,** *Hook. f. Ic. Pl. t.* 1092. A nearly glabrous shrub, 12 ft. high; branchlets subterete. Leaves obovate-oval, obtuse or shortly acuminate, wedge-shaped at the base, subsessile, 3–8 by $1\frac{1}{2}$–$3\frac{1}{4}$ in.; margins reflexed; lateral veins 9–12 on each side of midrib; stipules oval, rounded double back, concave, persistent, shortly ciliate, $\frac{1}{4}$–$\frac{3}{8}$ in. broad. Flowers 4–6 in. long, on short thick pedicels continuous with the calyx, fascicled in dense sessile cymes. Calyx $\frac{1}{6}$–$\frac{1}{5}$ in. long, puberulous, obscurely ribbed; lobes 1 in. long, oblong or narrowly elliptical, minutely ciliate, obtuse. Corolla-lobes 2–3 in. long, lanceolate, subobtusely tapering, glabrous inside; throat rigidly bearded. Anthers $\frac{2}{3}$–$\frac{3}{4}$ in. long. Style pubescent-pilose, included or shortly exserted.

Upper Guinea. Gaboon River and Kongui River, 1° N. lat. *Mann!*

2. **L. densiflora,** *Hook. f. Ic. Pl. sub t.* 1092. Branchlets puberulous, glabrescent, subterete or obtusely angular. Leaves oval, shortly acuminate, subcuneate at the base, shortly pilose on the veins beneath, 3–6 by $1\frac{1}{2}$–$3\frac{1}{2}$ in.; margins narrowly reflexed; lateral veins about 9 on each side of the midrib; petiole $\frac{1}{4}$–$\frac{1}{5}$ in.; stipules ovate, acuminate, nearly flat, erect, ciliate, persistent, $\frac{1}{2}$–$\frac{2}{3}$ in. long. Flowers $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, subsessile, densely packed in sessile shortly pubescent cymes. Calyx-tube $\frac{1}{8}$ in. long shortly pubescent; lobes lanceolate-oblong, subacute, ciliate, $\frac{1}{2}$–$\frac{2}{3}$ in. long, subfoliaceous. Corolla-lobes $\frac{4}{5}$ in. long, ovate, acuminate, subacute, subargenteous outside, glabrous inside; throat slightly hairy. Style included, glabrous.

Upper Guinea. Abbeokouta, *Irving!*

3. **L. senegambica,** *Hook. f. Ic. Pl. sub t.* 1092. Nearly glabrescent, much branched. Branchlets obtusely quadrangular, rigid. Leaves elliptical, obtusely acuminate, wedge-shaped at the base, rigid, subsessile, ranging up to $3\frac{1}{2}$ by $1\frac{1}{2}$ in.; margins reflexed; lateral veins 6–8 on each side of midrib; stipules ovate, caudate-acuminate, nearly flat, erect, ciliolate, $\frac{1}{2}$–$\frac{5}{8}$ in. long, persistent. Flowers 2–3 in. long, subsessile, in small dense cymes; bracteoles linear-subulate. Calyx-tube pubescent; lobes lanceolate, acute, rigid, obscurely ciliolate, $\frac{3}{8}$–$\frac{1}{2}$ in. long, subfoliaceous or subglumaceous. Corolla-lobes ovate, mucronate, $\frac{3}{4}$ in. long, shortly and appressedly hairy outside, glabrous inside. Style puberulous above, exserted; branches slender.

Upper Guinea. Senegambia, *Heudelot! Randia* (*Genipantha*), sp. n., Benth. in Hook. Niger Fl. p. 387. Crauford's Island (Sierra Leone?), *Hb. Afzelius!* (state with subglumaceous calyx-lobes and less exserted style).

Habit of *Heinsia jasminiflora*, DC.

4. **L. heinsioides,** *Hiern.* Branches hispidulous or glabrate, terete. Leaves elliptic-obovate, obtuse, wedge-shaped at the base, firmly chartaceous, glabrate and glossy above, strigulose on the midrib and on the 5–7 pairs of slender lateral veins, 2–$2\frac{3}{4}$ by $\frac{2}{3}$–$\frac{5}{6}$ in.; petiole $\frac{1}{6}$ in.; stipules nearly flat, erect, $\frac{1}{4}$ in. long or rather more. Flowers 2 in. long, puberulous outside, about 3–4 together, subsessile; bracteoles ovate, acute, rather small. Calyx-lobes linear-lanceolate and scarcely $\frac{1}{2}$ in. long in flower, linear and $\frac{2}{3}$–$\frac{3}{4}$ in. long in fruit. Corolla-lobes ovate, $\frac{2}{3}$ in. long. Anthers 1 in. long. Style hirsute above. Fruit $\frac{5}{8}$ in. long. Seeds $\frac{1}{12}$ by $\frac{1}{15}$ in.—Oliv. in Journ. Linn. Soc. Lond. xv. p. 91 (1876), sine descriptione.

South Central. Lake Tanganyika, *Cameron!*

26. **TARENNA,** Gaertn. Fruct. i. p. 139, t. 28, f. 3 (1788). (*Webera,* Schreb. (1791); Benth. et Hook. f. Gen. Pl. ii. p. 86; *Coptosperma,* Hook. f. (part.) in Benth. et Hook. f., l. c. *quoad flores.*)

Calyx-tube campanulate turbinate or shortly tubular; limb small, 5–6- rarely 4-toothed cleft partite or subtruncate. Corolla salver- or funnel-shaped; tube long or short; limb 5–6- rarely 4-partite, spreading; lobes oblong, dextrorsely contorted in æstivation (as seen from inside). Stamens 5–6, rarely 4, inserted at the mouth of the corolla; anthers narrowly elliptical or linear, subsessile, attached at the back near the base, glabrous. Disk annular, fleshy. Ovary 2-celled; style long, usually exserted; ovules numerous or rarely few, peltately attached to the fleshy placentas. Berry pisiform, 2-celled; cells usually 1- or few-seeded. Seeds not minute, usually rounded in front and angular on the sides with one or more pits.—Shrubs or trees with opposite shortly petiolate leaves, shortly ovate or subtruncate stipules and whitish flowers of moderate size in terminal and subterminal bracteolate cymes.

A genus occurring also in Madagascar, Seychelles, Asia and Australia. The flowers are rarely tetramerous in one Indian species according to Wight and Arnott, Prodromus Fl. Penins. p. 401.

Chomelia, Linn. (1737) is the correct name for this genus, but Chomelia, Jacq. (1763) is retained for an American genus of Rubiaceæ.

Calyx-limb 5–6-partite. Corolla pubescent outside.
- Leaves pubescent beneath. Corolla pubescent inside . . . 1. *T. angolensis.*
- Leaves pubescent only on the veins beneath. Corolla glabrous inside . . . . . 2. *T. mossambicensis.*

Calyx cleft or toothed. Corolla glabrous outside.
- Flowers 5–6-merous.
  - Shortly pubescent. Flowers ½ in. long . . . . . 3. *T. nilotica.*
  - Puberulous. Flowers ⅓ in long . . . . . 4. *T. conferta.*
  - Glabrate, except the inflorescence. Flowers ¼ in. long . . 5. *T. nitidula.*
  - Glabrous.
    - Leaves glossy, 1–4 in. long, brown in the dry state.
      - Flowers pentamerous . . . . . 6. *T. congensis.*
    - Leaves rather dull green in the dry state, 3½–6½ in. long.
      - Flowers 5–6-merous . . . . . 7. *T. pallidula.*
- Flowers 4-merous . . . . . 8. *T. tetramera.*

Calyx subtruncate, minutely dentate. Corolla glabrous outside.
- Flowers 1–1½ in. long . . . . . 9. *T. grandiflora.*
- Flowers ¼–½ in. long . . . . . 10. *T. nigrescens.*

1. **T. angolensis,** *Hiern.* A small tree, with glabrescent terete reddish branches and pubescent branchlets. Leaves oval, rounded mucronulate or very shortly pointed at the apex, rounded emarginate or obtuse at the base, shortly pubescent especially beneath where it is rather paler, subchartaceous, 1–2½ by ½–1½ in.; lateral veins about 6–7 pairs; petiole $\frac{1}{12}$–¼ in., shortly pubescent; stipules ovate-lanceolate, acuminate, $\frac{1}{6}$–¼ in. Flowers yellowish-white, fragrant, pentamerous or hexamerous, ⅜ in. long when expanded exclusive of the style, on very short pubescent pedicels, numerous, in dense terminal and sessile as well as subterminal and pedunculate corymbs of 1–2 in. diam.; bracteoles filiform. Calyx $\frac{1}{10}$ in. long; limb 5–6-partite, pubescent outside, glabrous inside; segments linear or filiform, unequal. Corolla salver-shaped; tube pubescent on both sides; lobes 5–6, oval, obtuse, pubescent outside, puberulous inside, ⅛ in. long. Anthers narrowly elliptical, rather shorter than the corolla-lobes. Disk glabrous. Ovary turbinate, small; style exserted by ⅓ in., pubescent below, glabrous above; stigma clavate-capitate, bifid; ovules about 4–6 together, sunk in the fleshy placenta.

Lower Guinea. Angola, at Quiballa, *Monteiro!* Congo, in bud, *Burton!*

2. **T. mossambicensis,** *Hiern.* A tree with glabrate roundedly 4-sided elongated branches; bark reddish-ashy; branchlets patent hoary-pubescent at the extremities. Leaves broadly oval, obtuse at the apex, rounded or slightly cordate at the base, thinly coriaceous, rather glossy and glabrous or subglabrous above, rather paler and pubescent on the midrib and on the six pairs of lateral veins beneath, 1½–2 by 1¼–1½ in.; petiole pubescent, $\frac{1}{10}$–⅛ in. long; stipules ovate, apiculate, nearly glabrous except the margin, about equalling the petiole. Flowers pentamerous, ⅜ in. long (exclusive of the glabrous style, which is exserted by ⅛ in.), on short pubescent pedicels, bracteolate, several together in trichotomous cymes of 1–1½ diam. Bracteoles filiform or subulate. Calyx-limb partite; segments sublinear, obtuse,

somewhat hairy. Corolla salver-shaped, pubescent outside, glabrous inside; limb $\frac{1}{5}$ in. diam.; lobes rounded. Anthers sublinear, glabrous, inserted at the throat, filaments short. Ovary pubescent, 2-celled; ovules 4 together, impressed on the fleshy placentas; style bilobed.

Mozamb. Distr. At Tette, local name "Goocoo," *Peters!*

3. **T. nilotica,** *Hiern.* A shrub, 20 ft. high. Branches dull-reddish, glabrate, terete, somewhat compressed and shortly pubescent towards the extremities. Leaves oval or somewhat obovate, acuminate, wedge-shaped at the base, chartaceous, glabrous above, shortly pubescent beneath, 3–9 by $1\frac{1}{4}$–4 in.; lateral veins about 10 pairs; petiole $\frac{1}{3}$–$1\frac{1}{4}$ in., shortly pubescent; stipules broadly ovate, connate at the base, subapiculate, keeled above, $\frac{1}{8}$ in long, caducous. Flowers pentamerous, $\frac{1}{2}$ in. long when expanded exclusive of the style which is exserted as far, without smell, on very short hirsute pedicels, in dense hemispherical sessile (or subsessile and pedunculate) corymbs of 2–3 in. diam. Calyx 5-cleft, hirsute, $\frac{3}{16}$ in. long; teeth ovate. Corolla salver-shaped, glabrous outside, pubescent within the throat; lobes oval-oblong, $\frac{1}{4}$ in. long, glabrous on both sides, spreading. Anthers $\frac{1}{4}$ in. long, acute, exserted; filaments $\frac{1}{15}$ in. long. Style pubescent below. Ovules about 4 together.

Nile Land. Niamniam-land, at Nabambisso and Beddo, *Schweinfurth!*

4. **T. conferta,** *Hiern.* A puberulous shrub, 5–15 ft. high. Leaves oval or somewhat obovate, cuspidate-acuminate, wedge-shaped at the base, chartaceous, glossy and glabrescent above, 3–7 by 1–3 in. or sometimes smaller; lateral veins 6–10 on each side of the midrib, slender, narrowly depressed on the upper surface; margins subreflexed; petioles ranging up to 1 in., shortly and appressedly pubescent; stipules deltoid, caudate-apiculate, $\frac{1}{6}$–$\frac{1}{4}$ in., erect. Flowers pentamerous, shortly pedicellate, in dense closely branched terminal cymes, fragrant, about $\frac{1}{3}$ in. long exclusive of the style which is exserted as much. Calyx $\frac{1}{8}$ in. long, shortly pubescent, green, acutely cleft. Corolla white or cream-coloured or greenish-white, glabrous outside pubescent inside; tube narrowly funnel-shaped; limb spreading, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., glabrous; lobes elliptic–oblong, obtuse. Anthers $\frac{1}{4}$ in. long. Style pubescent below. Berry glabrate, $\frac{1}{4}$ in. diam. or rather larger, pale green.—*Stylocoryne conferta*, Benth. in Hook. Niger Fl. p. 389.

Upper Guinea. Niger, by the Nun River, *Th. Vogel! Barter!* Brass, *Barter!* Fernando Po, *Mann!*

A specimen in young fruit from Onitsha, Niger (*Barter!*), with rather smaller obtuse-based leaves which do not turn so dark a colour in the dry state and with less dense cymes, apparently belongs to a new species nearly allied to this one.

5. **T. nitidula,** *Hiern.* A shrub, glabrate except the inflorescence. Leaves narrowly elliptical, acuminate into a long narrow acute apex, wedge-shaped at the base, chartaceous, glossy, 3–6 by 1–2 in., or the uppermost smaller; margins nearly flat; lateral veins 6–10 on each side of the midrib; petioles ranging up to $\frac{1}{2}$ in.; stipules deltoid, apiculate, hairy inside, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers pentamerous, $\frac{1}{4}$ in. long

when open exclusive of the style which is exserted as much, nearly $\frac{1}{2}$ in. in full bud, very shortly pedicellate, in much-branched terminal cymes. Calyx $\frac{1}{12}$ in. long, shortly pubescent, shortly cleft. Corolla glabrous outside; tube narrowly funnel-shaped; limb spreading $\frac{1}{3}$–$\frac{3}{8}$ in. diam. Anthers $\frac{1}{5}$–$\frac{1}{4}$ in. long. Style shortly pubescent. Berry $\frac{1}{5}$ in. diam.—*Stylocoryne nitidula*, Benth. in Hook. Niger Fl. p. 390, n. 2.

Upper Guinea. Sierra Leone, *Th. Vogel! Whitfield! Barter! Afzelius!*

Var. *Afzelii.* Calyx-lobes rounded, ciliolate, contorted in the same direction as the corolla-lobes.

Sierra Leone, *Afzelius!*

6. **T. congensis,** *Hiern.* A glabrous much branched shrub with smooth roundedly four-sided branches. Leaves elliptical, shortly acuminate, subapiculate, narrowed at the base, glossy, brown in the dry state, 1–4 by $\frac{1}{3}$–$1\frac{3}{4}$ in.; margins narrowly reflexed; lateral veins 4–6 on each side of midrib; petiole $\frac{1}{12}$–$\frac{1}{2}$ in.; stipules broadly ovate, apiculate, $\frac{1}{10}$ in. long. Flower-buds pentamerous, $\frac{1}{6}$ in. long, pedicellate, numerous, in terminal cymes. Calyx shortly and obtusely lobed; lobes narrowly contorted dextrorsely at base. Style glabrous. Ovules several.

Lower Guinea. Congo, *Chr. Smith!*

7. **T. pallidula,** *Hiern.* A glabrous rather pallid shrub, 8 ft. high. Branches terete, smooth. Leaves oval, acuminate, somewhat narrowed at the base, suboblique, of a rather dull pallid green colour when dry, $3\frac{1}{2}$–$6\frac{1}{2}$ by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; margins narrowly reflexed; lateral veins 4–6, slender; petiole $\frac{1}{6}$–$\frac{1}{2}$ in.; stipules short, the breadth of the branch, mucronate, about $\frac{1}{8}$ in. long. Flower-buds $\frac{1}{4}$ in., very shortly pedicellate, 5–6-merous, in terminal cymes. Calyx shortly tubular, with short obtuse teeth. Style glabrous. Ovary-cells many-ovuled. Fruit $\frac{1}{7}$ in. diam.

Upper Guinea. River Kongui, *Mann!*

8. **T. tetramera,** *Hiern.* A glabrous shrub, 1–3 ft. high. Stem terete. Leaves obovate-elliptical, narrowly and obtusely acuminate, alternate at the base, firmly chartaceous, ranging up to 8 by 3 in.; lateral veins about 10 pairs, slender; petiole to $1\frac{1}{4}$ in.; stipules broadly ovate, keeled above, apiculate, $\frac{1}{6}$–$\frac{1}{4}$ in. Flowers tetramerous, $\frac{1}{4}$–$\frac{2}{5}$ in. long when expanded exclusive of the style, on short pedicels, in dense terminal and subterminal sessile or pedunculate corymbs of 1–2 in. diam. Calyx-limb 4-cleft; lobes obtuse. Corolla glabrous except the pubescent throat; lobes roundly oval, $\frac{3}{16}$ in. long, obtuse. Anthers rather shorter. Disk glabrous. Style exserted by $\frac{1}{2}$–$\frac{3}{4}$ in., very slender, glabrous except the minutely puberulous clavate stigma, undivided. Ovules 2 together, collateral, orbicular, impressed on the convex face of the fleshy placentas.

Upper Guinea. Gaboon River (flowers shorter), *Mann!* Sierra del Crystal (flowers larger), *Mann!*

9. **T. grandiflora,** *Hiern.* A glabrous arborescent shrub, 10 ft. high. Leaves elliptical or obovate-oblong, abruptly acuminate, wedge-shaped at the base, membranous, rather glossy, 2–8 by 1–$3\frac{1}{2}$ in.;

margins nearly flat; lateral veins 6–10 on each side of the midrib; petioles ranging to 1 in.; stipules wide, $\frac{1}{12}$–$\frac{1}{8}$ in. long, subtruncate, shortly apiculate. Flowers pentamerous, 1–1½ in. long, on pedicels ranging up to $\frac{1}{3}$ in. long, in comparatively lax terminal cymes. Calyx $\frac{1}{10}$ in. long, subtruncate, minutely dentate. Corolla-tube narrowly cylindrical slightly funnel-shaped, green outside; limb $\frac{3}{4}$ in. diam., white inside. Anthers $\frac{1}{4}$–$\frac{1}{3}$ in. long. Style exserted as far as the anthers or rather farther, somewhat hairy on the middle part. Ovules 4 together, compressed, discoid.—*Stylocoryne grandiflora*, Benth. in Hook. Niger Fl. p. 390.

Upper Guinea. Fernando Po, *Th. Vogel! Barter! Mann!*

10. **T. nigrescens,** *Hiern.* Glabrous except the style the throat of the corolla and inside the stipules. Leaves lanceolate or oval, obtuse, wedge-shaped at base, glossy above, black in the dry state, 1–3 by ½–1$\frac{1}{6}$ in.; lateral veins 5–6, vague; margins slightly thickened beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules deltoid, obtuse, $\frac{1}{8}$ in. long, bearded within, with scarious margins. Flowers 4–5-merous, $\frac{1}{3}$ in. long, exclusive of the anthers and style, on drooping pedicels ranging up to $\frac{3}{4}$ in. which are bibracteolate in the middle, in lax many-flowered cymes. Calyx truncate, campanulate, subentire. Corolla-lobes oblong, obtuse, $\frac{1}{4}$ in. long; throat bearded. Anthers $\frac{1}{5}$–$\frac{1}{4}$ in. long. Style hairy in the middle, exserted as far as the anthers. Ovules 3 together, sessile, inserted side by side on the upper part of the placenta.—*Coptosperma nigrescens*, Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 87, *quoad flores.*

Mozamb. Distr. Moramballa, *Kirk!*

27. ENTEROSPERMUM, *Hiern.*

Calyx campanulate or cup-shaped, glabrous; limb short, with 5 small erect persistent teeth open in æstivation. Corolla funnel-shaped; tube shortly exserted glabrous outside; throat puberulous; lobes 5, dextrorsely contorted in æstivation as seen from outside, oval, spreading. Stamens 5, inserted on the throat of the corolla, glabrous, exserted; anthers linear, fixed at the back above the base, versatile; filaments short. Disk annular, glabrous. Ovary 2-celled; style glabrous above, somewhat pubescent below, exserted, about equalling the corolla, thinly club-shaped above; stigma undivided; ovules 2–3 together, collateral; placentas inconspicuous. Fruit pisiform, 1- or incompletely 2-celled; pericarp thinly fleshy; endocarp crustaceous. Seed solitary; testa thin, deeply intruded into the transverse ruminations of the horny albumen. Embryo nearly straight, small; radicle terete, inferior.—A glabrous rigid shrub, with opposite obtuse coriaceous leaves, rather large ovate interpetiolar undivided caducous stipules, and rather small white hermaphrodite flowers arranged in minutely bracteolate terminal pedunculate corymbose panicles.

A new endemic genus.

1. **E. littorale,** *Hiern.* A leafy much-branched shrub of 6–12 ft. Branches obtusely quadrangular, compressed towards the extremities; bark grey, smooth. Leaves decussate, oval or obovate, rounded at the apex or nearly so, wedge-shaped at the base, $1\frac{1}{4}$–$3\frac{1}{2}$ by $\frac{2}{5}$–$1\frac{2}{3}$ in.; reticulate, shining above, paler beneath; margins recurving; lateral veins about 4–5 pairs, often with little hairy depressions in the axils; petiole $\frac{1}{6}$–$\frac{2}{5}$ in.; stipules rigid, erect, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers about $\frac{1}{5}$–$\frac{1}{4}$ in. long, exclusive of the style which is exserted by nearly the same length, very shortly pedicellate, numerous; common peduncle about 1 in long. Calyx-teeth rounded. Corolla-tube $\frac{1}{6}$ in. long; lobes rather shorter. Fruit about $\frac{1}{4}$ in. diam.

Mozamb. Distr. Mozambique, *Forbes!* Mouth of W. Luabo River, *Kirk!* Luame River, by the sea coast, *Kirk!* Zanzibar Province, *Kirk!* Bagomojo, *Hildebrandt!*

A specimen with small leaves and young flower-buds, collected by Dr. Peters at Inhambane in the year 1846 on the Mozambique coast just south of the tropic, appears to belong to this genus, and possibly also to this species.

28. RANDIA, Houst.; Benth. et Hook. f. Gen. Pl. ii. p. 88.

Calyx-tube ovoid or turbinate, ribbed or terete; limb usually tubular, truncate toothed lobed or in one species spathaceous; lobes sometimes foliaceous. Corolla campanulate funnel-shaped or salver-shaped; tube in some species much elongated; limb spreading or reflexed, 5-lobed or occasionally 4-lobed, or in one species 8–7-lobed; lobes spreading or reflexed, dextrorsely contorted in bud (as seen from inside). Anthers sessile or subsessile, narrowly linear, glabrous, inserted at or near the throat or mouth of the corolla, included or exserted. Disk annular or cushion-shaped. Ovary 2- (in one species 4–3-) celled; style strong, glabrous or hairy; stigma club- or clapper-shaped, entire bidentate or bilobed, sulcate; ovules very numerous, immersed in the fleshy placentas. Berry 2-celled, usually many-seeded. —Erect or scandent spinous or unarmed shrubs or trees with opposite or verticillate leaves, rather short solitary entire stipules and large or moderate-sized flowers, solitary few together or corymbose, usually axillary or terminating short lateral branches or terminal.

A large genus occurring in nearly all tropical countries.

Flowers small or of moderate size, $\frac{1}{4}$–$\frac{3}{4}$ in. long.

Spinous. Inflorescence quasi-axillary or terminating short lateral shoots (§ CERISCUS) . . . . . 1. *R. dumetorum.*

Unarmed. Inflorescence axillary or subterminal (§ GYNOPACHYS).

Flowers in short axillary sessile or shortly pedunculate corymbs. Calyx-teeth small or ovate and spreading, not imbricated.

Green or turning red, not pallid. Corolla glabrous outside.

Anthers included or nearly so. Leaves subauriculate at the base . . . . . 2. *R. acuminata.*

Anthers exserted. Leaves more or less wedge-shaped at the base.

Calyx puberulous; limb subtruncate . . . . 3. *R. genipæflora.*

Calyx glabrous; limb cleft . . . . . 4. *R. rubens.*

Pallid. Corolla shortly and appressedly hairy outside . . . . . 5. *R. pallens.*
Flowers in subterminal corymbose peduncles of about 2 in. long. Calyx-lobes rounded, erect, imbricated. 6. *R. gambica.*
Flowers elongated, 2–10 in. long or more (§ EUCLINIA).
Calyx-limb regular, not spathaceous.
Flowers pentamerous.
Calyx-limb with short teeth, not foliaceous.
Flowers 2–2½ in. long. Leaves oblique subauriculate at the base . . . . . 7. *R? caudata.*
Flowers 5–9 in. long. Leaves narrowed at the base . . . . . 8. *R. maculata.*
Calyx-limb with subfoliaceous linear or spathulate lobes . . . . . 9. *R. macrantha.*
Calyx-limb with subulate-prolonged, not foliaceous lobes.
Leaves oblanceolate, 9–11 in. long. Fruit egg-shaped or fusiform, 3½–6 in. long . . . . . 10. *R. macrocarpa.*
Leaves obovate or oval, 4½–9 in. long. Fruit globose 1½–1¾ in. diam. . . . . 11. *R. malleifera.*
Flowers heptamerous or octomerous . . . . . 12. *R. octomera.*
Calyx-limb spathaceous . . . . . 13. *R. Munsæ.*

1. **R. dumetorum,** *Lam. Ill.* p. 227, t. 156, f. 4. A stiff spinous shrub. Branches elongated, often with abbreviated leafy lateral shoots, axillary, glaucescent, either glaucescent pale or brown; spines opposite or alternate, ¼–1 in. Leaves oval oblong or obovate, rounded at the apex, usually wedge-shaped at the base, glabrate or hispid with short slender hairs especially on the veins beneath, ⅓–3 by ⅙–2½ in.; lateral veins 4–6 on each side of the midrib, sometimes almost obsolete; petiole ranging up to ¾ in.; stipules deltoid, ⅙ in. long or shorter. Flower pentamerous (occasionally tetramerous), ¼–¾ in. long, fragrant, white or orange-yellow or greenish yellow, solitary or few together, quasi-axillary or on the short lateral shoots, on slender peduncles or pedicels ⅛–¾ in. long. Calyx glabrous or hairy; tube campanulate; lobes foliaceous, broadly ovate or oval or oblong or occasionally reduced or suppressed. Corolla appressedly hairy outside; tube rather longer than the calyx-lobes, with a ring of hairs near the top, silky or appressedly hairy outside; limb ample, reflexed. Anthers exserted. Fruit globose or egg-shaped, ½–1½ in. long, usually crowned by the calyx; pericarp more or less crass, firm, glabrate or somewhat hairy.—*Gardenia dumetorum*, Retz. Obs. ii. p. 14 (1781); Schweinf. Beitr. Fl. Æthiop. p. 135, t. 3, B.; *G. dumosa*, Salisb. Prod. Stirp. Hort. Chap. Allert. p. 65 (1796).

Nile Land. Abyssinia, *Schimper!* Sennaar, *Kotschy!* Madi, *Speke and Grant!* Djur-land, *Schweinfurth!*

Mozamb. Distr. Lupata, *Kirk!* right bank of Luabo, *Kirk!* opposite Senna, *Kirk!* Kongone mouth of the Zambesi, *Kirk!*

Occurs commonly in most parts of India, and extends to Ceylon, Hong Kong and the Malay Archipelago.

R. Kraussii, Harv. Thes. t. 33, from Natal, appears to belong to this very variable species.

The fruit is said to act as a fish-poison.

2. **R. acuminata,** *Benth. in Hook. Niger Fl.* p. 385. A shrub or small tree, 6–20 ft. high, glabrous or nearly so. Leaves obovate- or oval-oblong acuminate obliquely auriculate-cordate or rounded at the subsessile base, chartaceous, with 13–16 pairs of lateral veins, 4–12 by $1\frac{1}{3}$–$4\frac{1}{2}$ in. or those shorter from the axils of which the cymes proceed; stipules depresso-deltoid cuspidate or apiculate. Flowers $\frac{5}{8}$–$\frac{3}{4}$ in. long, subsessile or shortly pedicellate, somewhat secund on the branches of the shortly pedunculate axillary cymes of 1–3 in.; bracteoles small, depresso-deltoid, ciliolate. Calyx deep-green, $\frac{1}{2}$–$\frac{3}{4}$ in., narrowly funnel-shaped, truncate, minutely dentate. Corolla of a deep-rose colour or white; tube equalling or shortly exceeding the calyx; lobes ovate, acuminate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, spreading or reflexed; throat naked. Stamens included or nearly so. Style just exserted, with short spreading branches. Fruit ovoid or conical, often pointed, ribbed, $1\frac{1}{4}$–4 by $\frac{4}{5}$–3 in. Seeds somewhat compressed, obtusely triangular, $\frac{1}{4}$ in. long. —*Gardenia? acuminata,* G. Don! Gen. Syst. iii. p. 499. *Pomatium dubium,* G. Don, Gen. Syst. iii. p. 505, fide Benth. *l. c.*

Upper Guinea. Sierra Leone, *Afzelius! G. Don!* Nun River, *Th. Vogel!* Brass, *Barter!* Fernando Po, *Mann!* 1° N. lat., Gaboon River, *Mann!*
North Central. Monbuttu-land, *Schweinfurth!*

3. **R. genipæflora,** *DC. Prodr.* iv. p. 389. A shrub or tree ranging up to 20 feet high, glabrate except the calyx bracteoles &c. Leaves oval or oblong, acuminate, more or less wedge-shaped at the base, chartaceous, ranging up to 6 by $2\frac{1}{4}$ in.; lateral veins 6–7 pairs; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules deltoid or lanceolate, cuspidate or apiculate, ciliolate. Flowers about $\frac{3}{4}$ in. long, on pedicels of $\frac{1}{8}$–$\frac{1}{4}$ in., in short densely bracteolate axillary cymes. Calyx green, puberulous; limb about half the length of the corolla-tube, oblong, subtruncate, with 5 short lanceolate-subulate distant teeth. Corolla greenish-white, glabrous; tube cylindrical, slender; lobes lanceolate-oblong, spreading or reflexed, $\frac{1}{3}$–$\frac{3}{8}$ in. long. Anthers filiform, exserted, rather shorter than the corolla-lobes. Style branches exserted. Fruit globose, $\frac{1}{3}$ in. diam., crowned with the calyx-limb or its remains.

Upper Guinea. Senegambia, *Smeathman, Heudelot!* Siera Leone, *Afzelius! Kirk! Barter!* Niger, *Th. Vogel!* Fernando Po, 'Wild coffee,' *Barter! Mann!* Bagroo River, *Mann!* Cape Coast, *Brass!*

4. **R. rubens,** *Hiern.* A climbing glabrous shrub. Leaves elliptical, somewhat acuminate, narrowed at the base, coriaceous, in the dry state dark brown above and reddish beneath, 4–6 by $1\frac{3}{4}$–$2\frac{1}{4}$ in.; lateral veins about 6, inconspicuous; margins somewhat reflexed; petiole $\frac{1}{5}$–$\frac{1}{3}$ in., rather thick; stipules . . . . deciduous. Flowers $\frac{1}{3}$–$\frac{3}{5}$ in. long, on pedicels of $\frac{1}{10}$–$\frac{1}{5}$ in., numerous, in abbreviated sessile globose axillary cymes of about 1 in. diam.; bracteoles small, ovate, ciliolate. Calyx half the length of the flower; limb coriaceous, tubular, cleft; lobes ovate, ciliolate, spreading. Corolla thinly coriaceous, deeply lobed; lobes oblong, obtuse or, by the turning back of the sides

near the apex, acute, reflexed, minutely ciliolate; tube shaggy inside. Stamens exserted.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!* "apparently a parasite. Flowers herbaceous, with a touch of red, March."

5. **R. pallens,** *Hiern.* A pallid tree, 40 feet high, puberulous towards the extremities. Leaves narrowly elliptical, acuminate, wedge-shaped at the very shortly petiolate base, chartaceous, 3–6 by $1\frac{1}{8}$–$2\frac{1}{4}$ in.; lateral veins about 5–6 pairs; stipules deltoid, apiculate, puberulous, deciduous, $\frac{1}{6}$ in. long. Flowers $\frac{3}{8}$ in. long (in full bud), oblong, on short pedicels, in shortly pedunculate corymbose cymes of $\frac{3}{4}$–$1\frac{1}{2}$ in. Calyx campanulate-oblong, $\frac{1}{8}$ in. long, puberulous, subtruncate, with 5 minute teeth. Corolla felted outside; tube rather exceeding the calyx; lobes obtuse, oblong. Fruit 2-celled, globose, puberulous, (immature?) $\frac{1}{5}$ in. diam., crowded by the calyx-limb.

Upper Guinea. St. Thomas, 2000 ft. alt., *Mann!*

6. **R. gambica,** *Hiern.* Minutely puberulous towards the extremities, glabrescent below, not spinous. Leaves elliptical, obtusely narrowed at the apex, more or less wedge-shaped at the base, shortly petiolate or subsessile, not pallid, $2\frac{1}{2}$–$4\frac{1}{2}$ by $1\frac{1}{4}$–$2\frac{1}{2}$ in.; lateral veins about 7–8 pairs; stipules apparently short. . . . . Flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long, on rather shorter pedicels, glabrous, pentamerous, several together in opposite subterminal pedunculate corymbs of about 2 in. diam.; common peduncle about 2 in. long; bracteoles very short. Calyx $\frac{1}{4}$ in. long; limb half-cleft; lobes rounded, foliaceous, imbricated. Corolla $\frac{1}{2}$-cleft, lobes rounded, dextrorsely contorted in the bud (as seen inside); throat glabrous. Anthers sessile, inserted by the middle of the back on the corolla-tube. Ovary 2-celled; placentas 2; ovules numerous.

Upper Guinea. Banks of the Gambia River, *Whitfield!*

7. **R? caudata,** *Hiern.* A trichotomously branched shrub, 15 feet high. Branches terete rather slender, pubescent when young with ascending hairs. Leaves obovate-elliptical, caudate-acuminate, oblique rounded or on one side subauriculate at the base, glabrous except the veins beneath, toughly membranous, very shortly petiolate, 4–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., sometimes three together; lateral veins about 8–11 pair; stipules ovate, caudate-acuminate, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Flowers pentamerous?, solitary, terminating short branches in the forks of longer ones, erect, 2–$2\frac{1}{2}$ in. long; peduncles very short, bracteate at base. Calyx scarcely $\frac{1}{2}$ in. long, oblong, pubescent, with tawny appressed hairs; teeth 5?, linear-subulate, $\frac{1}{6}$–$\frac{1}{5}$ in. long, erect. Corolla white; tube slender, appressedly pubescent; limb puberulous inside, deeply lobed; lobes 4?, lanceolate, $\frac{2}{3}$–$\frac{4}{5}$ in. long, acute, dextrorsely contorted in æstivation. Anthers included.

Upper Guinea. 1° N. lat. Sierra del Crystal, *Mann!* A single specimen with one flower not available for dissection.

8. **R. maculata,** *DC. Prodr.* iv. p. 388. A much-branched shrub. 10–15 feet high, nearly glabrate. Branches sometimes three together.

Leaves elliptical or obovate-oblong, acuminate, narrowed at base, 1½–5 by ⅔–2½ in., chartaceous, the terminal ones often three together; lateral veins about 5–6 pairs, slender, often with glands near the union with the midrib; petiole ⅙–⅓ in; stipules short, broad, ciliolate, caducous. Flowers solitary, terminal, often on short lateral branches, suberect, sessile or subsessile, 5–9 in. long, fragrant, bracteolate at base. Calyx oblong, ½–1 in. long, glabrous, green; limb with 5 short ovate lanceolate or subulate teeth, or irregularly toothed, usually 5-ribbed above, lined with short pale hairs inside. Corolla-tube elongated, narrowly tubular, gradually funnel-shaped and 5-ribbed above, pubescent or puberulous outside, green or purple, cottony inside below; limb spreading, 2–4½ in. diam., white inside spotted with purple; lobes ovate, obtuse, widened above the base, puberulous inside, reflexing, 1–1¾ in. long, dextrorsely contorted in bud; throat glabrous. Stamens and style included or partly exserted. Anthers sessile, about 1 in. long. Fruit oval or oblong or globose, pointed, 1¼–3 in. long.—*Rothmannia longiflora*, Salisb. Parad. Lond. t. 65 (1807); *Gardenia Stanleyana*, Hook. ex Lindl. in Bot. Reg. 1845, t. 47; Bot. Mag. t. 4185; *Rothmannia Stanleyana*, Hook. Niger Fl. p. 383; *Gardenia speciosa*, A. Rich. in Mem. Soc. Hist. Nat. Par. v. p. 240 (1834).

Upper Guinea. Sierra Leone, *Whitfield! Afzelius!* Cape Coast, *Brass!* Gambia, *Capt. Boteler!* Abbeokuta, *Irving!* Nupe, *Barter!* Fernando Po, *Barter! Mann!*

North Central. Monbuttu-land, *Schweinfurth!*

9. **R. macrantha,** *DC. Prodr.* iv. p. 388. A climbing shrub, 9–30 feet high, glabrous except puberulous veins on the lower surface of the leaves. Leaves oval or obovate-oblong, opposite, deciduous, crowded near the extremities of the branches, cuspidate or caudate at apex, narrowed at base, 2½–8 by ⅘–3½ in., lateral veins about 8–9 pairs, inconspicuous; petiole ⅓–1 in.; stipules persistent, glumaceous, ovate or lanceolate, crowded at the extremities of the branches, obtuse, ⅜–⅝ in. long. Flowers solitary, pentamerous, fragrant, terminal, often terminating short branchlets, erect, subsessile, 6–10 in. long. Calyx-tube oblong; lobes subfoliaceous, linear or linear-spathulate, spreading, ½ in. long, persistent. Corolla-tube slender, cylindrical, green or yellowish; limb whitish 2–2½ in. diam.; lobes oval, obtuse, dextrorsely contorted in bud. Anthers and style partly exserted. Fruit globose or somewhat pear-shaped, not ribbed, 1–1½ in. diam.—*R. longiflora*, Salisb.! Parad. Lond. t. 93, non Lam.; *Gardenia longiflora*, Ait. Hort. Kew. ed. 2, i. p. 368 (1810); *G. macrantha*, Roem. et Sch. Syst. Veg. V. p. 237 (1819); *G.? longifolia*, G. Don! Gen. Syst. iii. p. 499 (1834); *R. Bowieana*, A. Cunn. ex Hook. Bot. Mag. t. 3409 (1835); *G. Devoniana*, Lindl. Bot. Reg. 1846, t. 63; *Rothmannia Bowieana*, Benth. in Hook. Niger Fl. p. 384; *Euclinia*, spec., Salisb. ex DC. *l.c.*

Upper Guinea. Sierra Leone, *G. Don! Whitfield! Afzelius! Smeathman! Wilford!* Cameroon Mountains, alt. 2–3,000 ft., *Mann!* Niger, Eppah, *Barter!*

10. **R. macrocarpa,** *Hiern.* A smooth shrub 12–20 feet high, glabrous in most parts; branchlets subglaucous. Leaves oblanceolate,

shortly acuminate, attenuate at the base, subcoriaceous, glossy, 9–12 by 3–4½ in., upper ones usually three together, lateral veins about 12–13 pairs; petiole ½–¾ in.; stipules short. Flowers solitary, drooping, quasi-axillary, 9 in. long, on robust recurved peduncles of 1 in.; bracteoles minute. Calyx oblong, about 1 in., glabrous outside, hairy inside, 5-angled; tube half the length; lobes subulate-prolonged. Corolla obsoletely tomentose outside; tube straight, narrow, campanulate above; limb 2–2½ in. diam.; lobes ovate, obtuse, dextrorsely contorted in the bud (as seen inside). Anthers included or nearly so. Stigma club-shaped. nearly included. Fruit egg-shaped or fusiform, 3⅓–6 by 1½–2 in., terete, smooth.

Upper Guinea. Muni River, 1° N. lat., *Mann!*

11. **R. malleifera,** *Benth. et Hook. f. Gen. Pl.* ii. p. 89. A puberulous shrub of 8–15 feet or a small tree. Leaves obovate or oval, acuminate, wedge-shaped or rarely obtuse at the base, thinly coriaceous, glabrous or nearly so, sometimes three together, 4½–9 by 2–4 in., lateral veins about 9–10 pairs, usually slender; petiole ⅜–¾ in.; stipules small, deltoid, acuminate. Flowers solitary, terminal, often terminating short lateral branches, about 6–7 in. long, fragrant, on a short bracteate peduncle. Calyx 1½–2 in. long, tawny, pubescent; tube oblong; lobes narrowly linear, erect, about half the length of the calyx. Corolla shortly and closely hairy outside, tawny; tube narrow-cylindrical, curved, funnel-shaped above; limb white, 2–4 in. diam.; lobes ovate, obtuse, dextrorsely contorted in bud (as seen inside). Anthers sessile, nearly included, 1–1⅔ in. long. Stigma exserted, clapper-shaped, large, 1½–2½ in. long, white except the yellow stigmatic upper part. Fruit globose, 1½–1¾ in. diam., of a greenish ashy colour, obsoletely 5-angled.—*Gardenia malleifera*, Hook. Bot. Mag. t. 4307; *Rothmannia malleifera*, Benth. in Hook. Niger Fl. p. 384, *Gardenia Whitfieldi*, Lindl. Bot. Reg. 1845, sub t. 47.

Upper Guinea. Sierra Leone, *Afzelius!* and others; Senegambia, *Heudelot!* 809, Rio Nunez, fide *Jardin* Herb. Cot. Occ. Afr. pp. 15, 16 (*G. Whitefieldiana*); Niger Expedition, *Barter!* Bagroo River, *Mann!* Gaboon River, *Mann!*

North Central. Monbuttu-land, *Schweinfurth!*

Nile Land. Bongo-land, *Schweinfurth!* Djur-land, *Schweinfurth!*

Lower Guinea. Congo, *Chr. Smith!*

Dr. Schweinfurth, Heart of Africa, i. p. 199: '. . . . The blippo (*Gardenia malleifera*), with the inky-sap of which the Niam-niam and the Monbuttoo delight to dye themselves.' See also vol. ii. pp. 104, 119.

Schweinfurth's specimen in the British Museum (No. 1877) consists of some detached flowers and a sterile branch bearing alternate exstipulate leaves.

Jardin, Herb. Cot. Occ. Afr. p. 15 (1851) gives *Gardenia Rothmannia*, Linn. f., from the Rio Nunez, Senegambia, where he states that it is abundant; the plant intended may be *Randia malleifera*, Benth. et Hook. f.

12. **R. octomera,** *Benth. et Hook. f. Gen. Pl.* ii. p. 89. A hirsute-pubescent shrub. Leaves oval or oblong, acutely acuminate, ternate or opposite, obtuse or somewhat narrowed at the base, subsessile, 2–4½ by ⅝–1¾ in., lateral nerves about 12 pairs, inconspicuous; stipules ovate cuspidate, about ¼ in. long. Flowers solitary, 7–8-

merous, erect, sessile, terminal in the forks of the branches, about 7 in. long. Calyx 1 in. long, deeply lobed, pubescent; lobes elongate-subulate. Corolla-tube narrowly cylindrical, green, pubescent on both sides, striate; limb 2–2½ in. diam., deeply 7–8-lobed; lobes oval, mucronate-cuspidate. Anthers 7–8, ½ in. long, exserted. Stigma clavate, bipartite, exserted.— *Gardenia octomera*, Hook. Bot. Mag. t. 5410.

Upper Guinea. Fernando Po, *Mann!* (Hort. Kew! October, 1863); Old Calabar, *Dr. Robb! Rev. W. C. Thomson!*

13. **R. Munsœ,** *Schweinf. mss. in Herb.* Shrubby. Leaves obovate-oblong, acute, subcuspidate, obliquely subauriculate at the base, thinly coriaceous, quite glabrous, subsessile, not verticillate, 10 by 3⅔–5 in.; lateral veins about 8 pairs; stipules. . . . Flowers 10½ in. long. Calyx 3 in. long; limb spathaceous, glabrous outside, silky-velvety inside, slit down one side about half way; spathe rather acute. Corolla-tube slender, silky-tomentose inside, funnel-shaped above; limb 3½ in. diam.; lobes broad rounded or obtusely pointed or apiculate, 2 in. long. Anthers partly exserted.

North Central. Monbuttu-land, *Schweinfurth!* (I have only seen a drawing and one leaf.)

Randia africana, G. Don, Gen. Syst. iii. 502, very imperfectly described, is unknown to me.

29. **GARDENIA,** Ellis; Benth. et Hook. f. Gen. Pl. ii. p. 89.

Calyx-tube globose campanulate turbinate or oblong; limb persistent tubular lobed dentate truncate or spathaceous, sometimes foliaceous or appendaged. Corolla salver-shaped funnel-shaped or campanulate, much exceeding the calyx; limb usually 5- (sometimes 4 or 6–11-) lobed; lobes spreading or recurved, contorted usually dextrorsely (as seen from inside) in our species. Stamens as many as the corolla-lobes, inserted at the mouth or on the tube of the corolla, sessile or subsessile; anthers linear, glabrous, fixed at the back above the base, obtuse or acute, exserted or included. Disk annular or cushion-shaped. Ovary 1-celled; style robust; stigma club-shaped or fusiform, terete or sulcate, usually bifid or lobed at the apex; ovules numerous, attached in longitudinal rows to 2 or more, rarely only 1, parietal placentas. Fruit indehiscent, 1-celled, often partially divided into cells by the placentas. Seeds numerous, usually immersed in pulp.—Shrubs or trees with opposite or rarely verticillate (3–4-nate) leaves and branches, connate stipules, and usually rather or very large subsessile or pedunculate flowers, solitary or rarely corymbose, usually terminating short branches or in the axils of the uppermost leaves.

A rather large genus scattered over the tropical and subtropical parts of the Old World.

Flowers solitary.

Branches glabrescent or hoary-puberulous, not tawny.

Corolla salver-shaped, with long slender tube.

Fruit oblong conical or globose.

Flowers 6–11-merous.
Calyx-lobes arising from the apex of the tube.
Placentas 4–6 . . . . . 1. *G. Thunbergia* (var.).
Calyx-lobes apparently arising below the apex of the tube. Placentas 6–11 . . 2. *G. Jovis-tonantis.*
Flowers 5-merous . . . . . 3. *G. resiniflua.*
Fruit fusiform.
Flowers 6–7-merous.
Calyx-lobes arising from the apex of the tube . . . . . 4. *G. assimilis.*
Calyx-lobes arising outside just below the truncate margin of the tube . . . . . 5. *G. nitida.*
Flowers pentamerous . . . . . 6. *G. Vogelii.*
Corolla funnel-shaped or campanulate.
Flowers subsessile. Calyx and corolla hairy inside their tubes.
Corolla shortly hairy on both sides. Placenta solitary . . . . . 7. *G. Manganjæ.*
Corolla glabrous outside. Placentas 2 . . 8. *G. Annæ* (var.).
Flowers pedunculate. Calyx and corolla glabrous on both sides.
Leaves oval, 1½–4 in. long; lateral veins about 4–5 pairs . . . . . 9. *G. Abbeokutæ.*
Leaves elliptic-oblong, 3–8 in. long; lateral veins about 8–10 pairs . . . . . 10. *G. konguensis.*
Branches tawny-puberulous . . . . . 11. *G. urcelliformis.*
Flowers corymbose or clustered.
Calyx-lobes ovate, obtuse, fimbriate-ciliate . . . 12. *G. fernandensis.*
Calyx-lobes lanceolate, acuminate, glabrous . . . 13. *G. ? zanguebarica.*

1. **G. Thunbergia,** *Linn. f.! ex Thunb. Diss. Garden.* (*resp. P. Djupedius*) pp. 11 et 17. n. 3 (16 Dec. 1780); *varr.* A shrub or tree, very low or ranging up to 15 ft. or even a large tree, glabrous puberulous or hispidulous. Branches ternate or 2 or 4 together, stout, crooked, pale or cinereous, leafy, not or rarely spinous, but sometimes abbreviated in the form of blunt spines. Leaves oval or obovate, ranging up to 6 by 3 in. but usually smaller, opposite ternate or 4 together, obtuse or subacuminate, more or less wedge-shaped towards the acute or subauriculate sessile subsessile or shortly petiolate base, veins more or less pellucid, lateral veins rather close, slender, parallel; stipules shortly sheathing. Flowers terminal, solitary, sessile or subsessile, girt at the base by the uppermost stipules, ranging up to 5 or 6 in. long, usually shorter, 6–10-merous, fragrant. Calyx ranging up to 1½ in. long, tubular, more or less dilated upwards, terete or costate, hairy at least inside; equally or unequally toothed or lobed or truncate and entire, or slit deeply down one side so as to become spathaceous; lobes narrow or subfoliaceous, obtuse, green. Corolla salver-shaped; limb white, turning cream-coloured or yellow; tube narrow and cylindrical below, funnel-shaped above; mouth hairy; lobes obovate oval or oblong, ranging up to 1½ in. long, obtuse, contorted dextrorsely (as seen from inside) in bud. Anthers partly exserted or included, glabrous. Stigma exserted, 2–6-lobed, exserted. Fruit ellipsoidal egg-shaped globose or conical, 1–4 by 1–3 in ; pericarp woody, crass

or fibrous. Seeds numerous, taking 2 or 3 years to ripen; placentas 4–6.—Linn. f. Suppl. Sp. Pl. p. 162 (1781); Bot. Mag. t. 1004. *Bergkias*, Sonnerat, Voy. N. Guin. p. 47, tt. 17, 18 (1776). *Thunbergia capensis*, Montin in Act. Holmiens. 1773, p. 289, t. 11. *G. verticillata*, Lam. Encycl. ii. p. 607 (1786). *Caquepiria Bergkia*, Gmelin Syst. p. 651 (1791). *G. speciosa*, Salisb. Prod. Stirp. Hort. Chap. Allert. p. 63 (1796). *G. crassicaulis*, Salisb. Parad. Lond. t. 46 (1806). *Piringa*, A. L. de Juss. in Mém. Mus. Par. vi. p. 399 (1820). *G. ternifolia*, Schum. et Thonn. Beskr. Guin. Pl. p. 147, ex descript. *G. medicinalis*, Vahl in Schum. Beskr. Guin. Pl. p. 148 (1827) ex descript. *G. lutea*, Fresen. in Mus. Senckenb. ii. p. 167 (1837). *G. Tinneæ*, Kotschy et Heuglin in Bot. Zeit. 1865, p. 173, t. 8; Kotschy et Peyr. Pl. Tinn. p. 34, t. 16, A, B. Cfr. *G. triacantha*, DC. Prod. iv. p. 382; Perr. et Lepr. ex A. Rich. in Mem. Soc. Hist. Nat. Par. V. p. 117 (1834).

Upper Guinea. Senegambia, *Roger! Whitfield! Leprieur and Perrottet Park!* Sierra Leone, *Afzelius!* Niger, Nupe, *Barter!* Guinea, *Thonning* Yomba, *Barter!*

North Central. Bornu, *E. Vogel!*

Nile Land. Abyssinia, *Rüppell, Schimper! Q. Dillon and Petit! Ferret and Galinier* Sennaar, *Kotschy!* Gallabat, *Schweinfurth!* White Nile, *Petherick!* Bongo, *Tinne and Heuglin* Madi (medicinal), *Speke and Grant!* Mittu-land, Djur-land, and Niamniam-land, *Schweinfurth!*

Lower Guinea. Angola, Golungo Alto, *Welwitsch!* (fruit in the Kew Museum); Congo, *Chr. Smith!*

South Central. Lake Ngami, *McCabe! Chapman and Baines!*

Mozamb. Distr. Lake Shirwa, *Meller!* Moramballa and Manganja Hills, *Waller!* (fruit food of elephants); Zanguebar, *Kirk!*

Occurs also south of the tropic.

A very variable plant, but apparently incapable of satisfactory division into species; none of our forms accord exactly with the typical Cape forms, which have spathulate subpetiolate calyx-lobes, but Cape forms occur with calyces like ours.

The Indian species, *G. gummifera*, Linn. f., appears to be different, but is exceedingly close and is difficult to separate by good characters; the veins of the leaves are, however, opaque.

A fruit 2¼ by 2 in., subterete, rather rough, with about 6 placentas, collected by Dr. Kirk, in grassy plains near Lake Shirwa, may belong to this species; it grows close to the ground and has a short woody creeping stem, or often scarcely any, being on the surface of the ground; the leaves are lanceolate.

A specimen from the Gambia River collected by Whitfield in 1842 has some of the leaves red and others variegated with red veins, and the limb of the corolla is much smaller than usual in the species.

2. **G. Jovis-tonantis,** *Hiern.* A small tree of 5–9 ft. high, puberulous at the extremities. Wood compact, heavy, very strong, durable, yellowish; trunk 1½–2 ft. diameter. Ramifications ternate. Leaves ternate, oval or obovate, obtuse, wedge-shaped at the base, subsessile, thinly coriaceous, shining above, glabrous except little hairy depressions in the axils of the 8–10 pairs of lateral veins beneath, ranging up to 8 by 4½ in.; stipules short, rounded, connate at the base, intra-petiolar. Flowers 1½–3 in. long, aromatic, yellow, trumpet-shaped, decamerous or 6–11-merous, terminal or terminating short lateral branches, sessile or subsessile. Calyx-tube ovoid, rather ex-

ceeding the ovary, hairy inside; limb often irregularly lobed; lobes obtuse, glabrous, mostly $\frac{1}{5}$–$\frac{3}{5}$ in. long, apparently starting from below the apex of the truncate tube. Corolla-tube glabrous outside or nearly so; throat thinly bearded; limb $1\frac{1}{2}$–3 in. diameter; lobes rounded. Style shortly pubescent, stout; stigma 6–11-lobed. Ovary 1-celled; placentas 6–11. Fruit as large as a common egg, somewhat flattened, green; pericarp woody; seeds plentiful, flattened.—*Decameria Jovis-tonantis*, Welw. Apontamentos, p. 579, nota 12.

Lower Guinea. Golungo Alto, Alta Queta, *Welwitsch!* Bumbo, *Welwitsch!* Perhaps only a variety of the variable *G. Thunbergia*, Linn. f.

3. **G. resiniflua,** *Hiern.* An hispidulous or scabrid bush of 12 ft. high, with resinous secretion; branches often ternate, leafy towards the extremities. Leaves obovate, cuspidate, narrowed towards the oblique subsessile base, 1–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{3}$ in.; lateral veins opaque, rather close, parallel; stipules shortly sheathing. Flowers solitary, terminal, about 1 in. long, pentamerous, shortly pedunculate; peduncle slender, girt by the uppermost stipules. Calyx shortly hairy, about $\frac{2}{5}$ in. long, persistent, with short subglobose tube; lobes subfoliaceous, linear or linear-oblong, $\frac{1}{3}$ in. long, obtuse. Corolla salver-shaped, fragrant, puberulous; lobes oval, obtuse, dextrorsely contorted in bud, white, turning yellowish, $\frac{1}{3}$ in. long. Fruit globose, $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, puberulous; pericarp thin; placentas 2.

Mozamb. Distr. Lake Nyassa, Cape Maclear, Lupata and Tete, *Kirk!*

4. **G. assimilis,** *Herb. Afzel.* Shrubby, glabrous, pallid, unarmed. Branches terete, 4–2-nate. Leaves opposite or in whorls of three, oval or obovate, much acuminate, wedge-shaped and subequal at the base, glossy, pallid on both sides especially beneath, chartaceous, ranging up to 4 by $1\frac{1}{2}$ in.; lateral veins about 5–7 pairs, opaque; ultimate nerves pellucid; margins flat or nearly so; petiole scarcely any or narrowly winged; stipules connate below, ovate, $\frac{1}{4}$–$\frac{3}{8}$ in. Flowers subsessile or shortly pedunculate, 4 in. long, solitary in each terminal axil, i.e. usually 3 together, terminal or terminating short shoots. Calyx-tube oblong; free portion tubular, $\frac{1}{3}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. diameter, foliaceous, glabrous except the sparsely, sometimes hispid, tube, or ciliolate truncate margin, furnished outside just below the truncate margin with 6 somewhat unequal, spathulate, obtuse, foliaceous, glabrous lobes of $\frac{3}{5}$–$\frac{3}{4}$ by $\frac{1}{9}$–$\frac{1}{4}$ in. Corolla-tube very slender, glabrous; limb 3 in. diameter, 6-partite; segments oval; anthers included. Ovary glabrous, 1-celled; ovules numerous, not immersed in the 3 parietal placentas. Stigma subcapitate, 3-cleft at apex. Fruit fusiform, $3\frac{1}{3}$ by 1 in., longitudinally wrinkled; pericarp woody, not very thick; placentas 3. Seeds numerous, compressed, $\frac{1}{5}$ by $\frac{1}{7}$ in.

Upper Guinea. Sierra Leone, *Herb. Afzelius! Brass! Wilford!*

ε. **G. nitida,** *Hook. Bot. Mag.* t. 4343. A glabrescent shrub; branches not ternate. Leaves narrowly elliptical, acuminate, attenuate to the subsessile or shortly petiolate base, glossy, 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.,

margins rather undulate, lateral veins about 8–10 pairs; stipules ovate, rather acute or acuminate, $\frac{1}{3}$–$\frac{1}{2}$ in. long, clasping. Flowers solitary, fragrant, subsessile, lateral, glabrescent, 3–3$\frac{1}{2}$ in. long. Calyx-limb elongated, tube narrowly obconical; lobes 6–7, spathulate, foliaceous, $\frac{1}{4}$–1 in. long, glabrous. Corolla salver-shaped, white, glabrous; tube slender, exceeding the calyx; limb 3 in. diameter, 6–7-partite; lobes oval-oblong or obovate-oblong, obtuse, 1$\frac{1}{2}$–1$\frac{2}{3}$ in. long, reflexed. Anthers equalling the corolla-tube. Stigma just exserted, 4-lobed. Ovary narrowly turbinate.

Upper Guinea. Sierra Leone, *Whitfield.*

6. **G. Vogelii,** *Hook. f. in Hook. Ic.* t. 782–3. A glabrous unarmed shrub, 8–15 ft. high. Branches not verticillate. Leaves as well as the branches opposite, not ternate, oval or obovate-oblong, cuspidate or acuminate, obliquely narrowed or rounded or subauriculate at the base, chartaceous, 3–10 by 1–3$\frac{1}{3}$ in. long, paler beneath; lateral veins about 8–10 pairs; petiole short or ranging up to 1 in.; stipules connate or contiguous at base, ovate, clasping, about $\frac{1}{3}$ in. long. Flowers solitary, terminal, very shortly pedunculate, white, fragrant, about 6 in. long; peduncle girt by the uppermost stipules. Calyx-limb narrowly oblong, terete, persistent, 1 in. long, shortly and sometimes unequally laciniate; teeth erect, acute. Corolla-tube slender; limb spreading; lobes 5, linear-oblong, obtuse, about 2 in. long, dextrorsely contorted in bud (as seen from inside). Anthers included. Fruit elongate-fusiform, 2$\frac{1}{4}$–3–4 in. long, $\frac{1}{2}$–1$\frac{1}{2}$ in. thick, greenish. Placentas 3.—Hook. Niger Fl. p. 381, t. 38–9 (1849).

Upper Guinea. Niger, Abòh, *Th. Vogel! Barter!*
Nile Land. Niamniam-land, *Schweinfurth!* Djur-land, *Schweinfurth* in Bot. Zeit. 1871, p. 329 (used as a paint for the body).
Lower Guinea. Congo, *Chr. Smith!*

7. **G. Manganjæ,** *Hiern.* A handsome shrub, glabrescent except the flowers. Branches opposite. Leaves elliptical, subacuminate, narrowed at the base, firmly chartaceous, 3–4$\frac{1}{2}$ by 1–2 in., margins subrevolute; petiole $\frac{1}{6}$–$\frac{1}{3}$ in.; stipules deltoid, short. Flowers solitary, 2–3 in. long, on very short bracteate peduncles constituting abbreviated lateral branches; bracts imbricated, deltoid, short, like the stipules. Calyx oblong, about $\frac{1}{2}$ in. long; limb $\frac{1}{4}$ in., 5-toothed at the apex, glabrate outside, hairy inside; teeth short, broad, apiculate. Corolla shortly hairy on both sides, funnel-campanulate; narrow part of the tube exceeding the calyx, limb 1$\frac{1}{2}$–2 in. diameter; lobes oval, rather obtuse, about $\frac{3}{4}$ in. long, contorted dextrorsely in the bud (as seen from inside). Anthers and style included. Placenta solitary.

Mozamb. Distr. Zambesi-land, Manganja Hills, *Meller!* Tshiradzura Mountain, alt. 4000 ft., *Kirk!*

8. **G. Annæ,** *P. Wright in Trans. Royal Irish Acad.* xxiv. p. 575, t. 28 (1869); var. **Moramballæ,** *Hiern.* Glabrescent. Branches rather slender, not verticillate. Leaves elliptical, mostly acuminate, wedge-shaped at the base, rather paler beneath, firmly chartaceous,

3–5 by $\frac{4}{5}$–$1\frac{3}{4}$ in., lateral veins about 5 pairs, with small tufts of short hairs in the axils; petiole $\frac{1}{8}$–$\frac{1}{5}$ in.; stipules deltoid, acuminate, $\frac{1}{6}$ in. Flowers solitary, subsessile, terminating obsolete lateral branches, with strong jasmine-like fragrance, about 3 in. long. Calyx $\frac{3}{4}$ in. long, oblong, glabrous outside, shaggy inside; limb $\frac{3}{8}$ in. long, 5-toothed at apex, slit partly down one side; teeth obtuse, mucronate. Corolla funnel-shaped, glabrous, except obsoletely ciliolate lobes; tube exceeding the calyx, hairy inside; limb about 2 in. diameter, 5-cleft; lobes oval, about 1 in. long, $\frac{3}{4}$ in. wide, dextrorsely contorted in bud. Anthers sessile, inserted by the middle at the mouth of the corolla, linear, $\frac{3}{4}$ in. long. Stigma club-shaped, glabrous, bilobed at apex, exserted. Placentas 2.

Mozamb. Distr. Zambesi, Moramballa, *Waller!*

Differs from the type of *G. Annæ*, P. Wr., which occurs in the Seychelles Islands, by larger flowers, obtuse mucronate not acutely apiculate calyx-teeth, and by oblong not obconical ovary.—Perhaps a distinct species.

9. **G. Abbeokutæ,** *Hiern.* A glabrous shining shrub, with spreading opposite leafy branches. Leaves oval, more or less acuminate, rather obtuse at the base, firmly chartaceous, $1\frac{1}{2}$–4 by $\frac{3}{5}$–$1\frac{3}{5}$ in., margins revolute, lateral veins about 4–5 pairs, often glandular in the axils beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules deltoid-apiculate, $\frac{1}{6}$ in. long. Flowers solitary, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long, on peduncles of $\frac{1}{2}$–1 in., in the axils of the uppermost leaves, without bracteoles. Calyx-limb short, glabrous on both sides, campanulate, rather wider than the ovary, 5-cleft; lobes deltoid, acuminate. Corolla funnel-shaped, glabrous on both sides; narrow part of the tube much exceeding the calyx; limb 1–2 in. diameter, 5-lobed; lobes ovate, $\frac{1}{2}$–1 in. long, mucronate. Anthers and style included. Placentas 2.

Upper Guinea. Abbeokuta, *Irving!* Bagroo River, *Mann!*

10. **G. konguensis,** *Hiern.* A glabrous shrub, 10 ft. high. Leaves opposite, elliptic-oblong, acutely acuminate, wedge-shaped at the base, glossy, 3–8 by $1\frac{1}{2}$–2 in., margins revolute; lateral veins about 8–10 pairs; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules deltoid, acute, about $\frac{1}{6}$ in. long. Flowers solitary, about 3 in. long, spreading, on peduncles of $\frac{2}{3}$–$\frac{3}{4}$ in., in the axils of the uppermost leaves, without bracteoles. Calyx-limb $\frac{1}{3}$–$\frac{3}{8}$ in. long, glabrous on both sides, 5-cleft, campanulate, wider than the ovary; lobes ovate, acuminate, erect. Corolla funnel-shaped, glabrous on both sides; narrow portion of tube equalling the calyx; limb $1\frac{1}{2}$–2 in. diameter, 5-cleft; lobes broadly ovate, obtuse, sinistrorsely ? contorted in bud (as seen from inside). Anthers 5, included, $\frac{1}{2}$ in. long, inserted at middle of corolla-tube. Stigma club-shaped, included, bilobed at apex. Placentas 2. Ovary fleshy.

Upper Guinea. Mount John River, Kongui, 1° N. Lat., *Mann!*

11. **G. urcelliformis,** *Schweinf. mss. in Herb. sub Randiâ.* Shrubby. Branches subterete, shortly pubescent when young. Leaves opposite or verticillate in threes, elliptical, much acuminate, wedge-shaped at the base, membranous, glabrous except the veins, $3\frac{1}{2}$–$4\frac{3}{4}$ by

1½–1⅞ in., lateral veins about 6–9 pairs; petiole ⅙–⅓ in. long, puberulous; stipules short, broad, caducous, leaving a line of hairs above the scar. Flowers apparently solitary, terminating abbreviated branches in the forks of longer ones; bracts filiform. Calyx-limb with scattered hairs outside, shaggy inside, ⅔ in. long; lobes 5, ovate, caudate-acuminate, ¼ in. long. Ovary urceolate-oblong, 1-celled. Placentas 2. Fruit ellipsoidal, 2¼ in. long, glabrous.

Nile Land. Niamniam-land, *Schweinfurth !*

12. **G. fernandensis,** *Hiern.* A nearly glabrous shrub, 12 ft. high; branches not verticillate. Leaves oval, subcuspidate, obtuse or rounded at the base, chartaceous, 6–8 by 3⅓–4½ in., lateral veins about 6 pairs; petiole ¾–1¾ in.; stipules ovate, obtuse, clasping, ciliolate, connate or contiguous at base, ⅓–½ in. long. Flowers 1¼–1½ in. long, shortly pedicellate, in dense corymbose cymes terminating the terminal and axillary shoots of the year with leaves as yet not fully developed. Calyx-limb campanulate, 1/10–⅛ in. long, green, 5-cleft; lobes ovate, obtuse, fimbriate-ciliate. Corolla salver-shaped, white, very fragrant; tube narrow, gradually funnel-shaped above; limb spreading, 5-partite; lobes oblong, obtuse, dextrorsely contorted in the bud (as seen inside). Anthers 5, half exserted. Style filiform; stigma bifid. Placentas 2.

Upper Guinea. Fernando Po, *Mann !*

13. **G.? zanguebarica,** *Hiern.* A densely branched glabrous shrub, a yard high or more; branches not verticillate. Leaves elliptical, subacuminate, somewhat wedge-shaped at the base, thinly coriaceous. 3–4½ by 1¼–1¾ in., rather shining, lateral veins about 6–8 pairs, not conspicuous; petiole ⅙–¼ in.; stipules ovate acuminate, ¼–⅜ in., appressed, subpersistent, covering a ring of hairs inside the base. Flowers more than ½ in. long, subsessile, a few together, in terminal and quasi-axillary short clusters. Calyx-limb 5-partite, ⅕ in. long; lobes lanceolate, acuminate. Ovary 1-celled; placentas 2. Fruit (perhaps monstrous in the specimen seen) pyriform, 3 in. long.

Mozamb. Distr. Zanzibar coast, shore-woods at Bagamojo, *Hildebrandt !*

In the absence of the corolla, the genus of this species cannot be satisfactorily ascertained; it may belong to *Mitriostigma.*

30. MACROSPHYRA, Hook. f. in Benth. et Hook. f.

Gen. Pl. ii. p. 86.

Calyx-tube oblong, equalling the ovary, pubescent; limb 5-partite, persistent; lobes lanceolate-subulate equalling the tube. Corolla salver-shaped; tubes lender, elongated, funnel-shaped and pubescent above, glabrous inside; lobes 5, ovate, widely clawed at base, dextrorsely contorted in æstivation (as seen from inside). Stamens 5, inserted between the corolla-lobes; anthers linear, exserted, sessile, glabrous. Disk annular, fleshy. Ovary 1-celled; style robust, very long, glabrous, much exserted; stigma capitate, bifid, large; ovules numerous, inserted in many rows on the two parietal stipitate pla-

centas. Berry pyriform-globose; seeds numerous, compressed, immersed in pulp.—A scandent shrub, with terete branches leafy at the extremities, hirsute opposite petiolate deciduous leaves, rather large glabrescent glumaceous stipules imbricating below the uppermost leaves, and long subsessile flowers clustered at the extremities of the branches.

A monotypic genus.

1. **M. longistyla,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* ii. p. 86. Shoots tawny-hirsute. Leaves oval broadly ovate or obovate, more or less acuminate, wedge-shaped or obtuse or even excavated at the base, submembranous, 2–7½ by 1–4¾ in.; lateral veins 6–8 on each side of midrib; margins flat; petiole ½–1¾ in.; stipules ovate, ⅓–1 in. long, deciduous, acute or apiculate. Flowers fragrant, cream-coloured, 1½–3 in., exclusive of the style which is exserted nearly by as much more. Calyx ¼–½ in. long, pubescent. Corolla-tube hirsute-pubescent outside; limb ¾–1½ in. diameter. Anthers ⅕–¼ in. long. Style green. Fruit 1½–2 by 1½–1¾ in.—*Randia longistyla*, DC. Prodr. iv. p. 388. *Gardenia longistyla*, Hook. Bot. Mag. t. 4322. *Oxyanthus villosus*, G. Don, Gen. Syst. iii. p. 494.

Upper Guinea. Senegambia, *Brunner! Boivin! Leprieur and Perrottet! Roussillon;* Sierra Leone, *Whitfield!* and others; Abbeokuta, *Irving! Barter!* Bagroo River, *Mann!* Dahomey, *Burton!*

Nile Land. Niamniam-land, *Schweinfurth!*

Cultivated in Jamaica, and introduced into England.

Gardenia paleacea, A. Rich. in Mém. Soc. Hist. Nat. Par. v. 241, 294 (1834), may possibly belong here.

31. **OXYANTHUS,** DC.; Benth. et Hook. f. Gen. Pl. ii. p. 91.

Calyx-tube campanulate or turbinate-oblong; limb erect, short, glabrous inside, truncate or 5-cleft; teeth usually subulate. Corolla salver-shaped; tube elongated, very slender, cylindrical, much exceeding the calyx; throat glabrous; limb 5-partite, spreading or reflexed; lobes narrowly elliptical or lanceolate, acuminate, dextrorsely contorted in the bud (as seen from inside). Stamens 5, inserted at the mouth of the corolla-tube; anthers linear, exserted, glabrous, sessile or subsessile, acuminate. Disk cushion-like, annular. Ovary 2-celled; style very slender, usually exserted, glabrous; stigma usually fusiform or narrowly club-shaped, bifid at the tip; ovules numerous, not immersed in the two fleshy placentas. Fruit baccate, oblong-elliptical or subglobose, terete or ribbed, 2–1-celled; pericarp coriaceous or fleshy. Seeds usually numerous, in one species solitary in the cells, rather large; testa fibrous; albumen copious, firmly fleshy; cotyledons ovate, foliaceous, as long as the terete radicle.—Shrubs or trees with subterete branches, opposite shortly petiolate leaves, ovate stipules, and usually white flowers in axillary racemes or panicles.

A genus confined to Africa, containing three species in the Cape Flora and the following:—

Ovules oval or oblong. Seeds numerous.
Ovary 2-celled.
Stigma fusiform or narrowly clavate.
Bracteolate.
Puberulous or pubescent.
Leaves wedge-shaped at the base . . . . . 1. *O.? Smithii.*
Leaves obtuse rounded or subauriculate at the base.
Flowers white, 6–7 in. long.
Fruit terete, not sulcate . . . . . 2. *O. tubiflorus.*
Fruit sulcate . . . . . 3. *O? sulcatus.*
Flowers red tipped with green, about 2 in. long 4. *O. rubriflorus.*
Glabrous.
Leaves and shoots deep green . . . . . 5. *O. speciosus.*
Leaves beneath and shoots pale . . . . . 6. *O. querimbensis.*
Ebracteolate or minutely or obsoletely bracteolate.
Calyx truncate, minutely toothed. Inflorescence pyramidal.
Flowers 5–8 in. long . . . . . 7. *O. formosus.*
Flowers about 1 in. long . . . . . 8. *O. breviflorus.*
Calyx-teeth subulate, rather short. Inflorescence globose . . . . . 9. *O. gracilis.*
Stigma capitate, dilated. . . . . 10. *O? platystylis.*
Ovary 1-celled . . . . . 11. *O. unilocularis.*
Ovules discoid. Seeds solitary in the 2 cells of the fruit . 12. *O. macrophyllus.*

1. **O. ? Smithii,** *Hiern.* Branches pubescent, apparently elongated. Leaves oval-oblong, subacuminate, wedge-shaped at the base, chartaceous, shortly pubescent on the depressed midrib and beneath on the 6–7 pairs of lateral veins, rather paler beneath, 5–6 by $1\frac{2}{3}$–2 in.; petiole about $\frac{1}{4}$ in. long, pubescent; stipules rather longer, with a long setiform acumen from a short broad base. Flowers subsessile or shortly pedicellate, few together on short bracteolate pubescent racemes scarcely exceeding the petioles; bracteoles lanceolate, pubescent. Calyx-limb on the young fruit deeply 5-lobed, $\frac{1}{6}$ in. long, pubescent; lobes lanceolate, acute, somewhat contorted dextrorsely (as seen from inside), connivent. Young fruit 2-celled, rounded at the base; seeds 2 together.

Lower Guinea. Congo, *Chr. Smith!*

In the absence of the flower, the genus cannot be satisfactorily ascertained; the habit is rather like *Tricalysia*.

2. **O. tubiflorus,** *DC. Prodr.* iv. p. 376. A hispidulous-puberulous evergreen shrub of no great size. Leaves oblong or ovate-oblong, more or less acuminate, obtuse rounded or obliquely subauriculate (the upper ones sometimes narrowed) at the base, glabrate above, obsoletely velutinous beneath, thinly coriaceous, 3–7 by 1–3 in., lateral veins about 6–8 pairs; petiole $\frac{1}{8}$–$\frac{1}{5}$ in.; stipules ovate acute erect, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Flowers about 6–7 in. long, sweet-scented, about 3–6 together (sometimes more numerous), on short pedicels in abbreviated axillary racemes. Bracteoles lanceolate, very acute. Calyx-limb about $\frac{1}{8}$ in. long, puberulous, 5-cleft; teeth ovate, acuminate. Corolla-tube scattered with short slender hairs; lobes $\frac{3}{4}$–$1\frac{1}{4}$ in. long, white. Ovary 2-celled. Fruit ellipsoidal, glabrate, terete, 1 in. long, 2-celled, rounded

at the base. Seeds compressed, $\frac{1}{4}$ in. long.—Bot. Mag. t. 4636. *Gardenia tubiflora*, Andr. Bot. Rep. t. 183, non A. Rich.; *Oxyanthus speciosus*, Sims, Bot. Mag. t. 1992; Ait. Hort. Kew., ed. 2, i. 371; Lindl. Collect. Bot. t. 13, non. DC.; *O. hirsutus*, DC. *l. c.* n. 3; *Ucriana racemosa*, Schum. et Thonn. Pl. Guin. p. 107; *O. Thonningii*, Benth. in Hook. Niger Fl. 388.

Upper Guinea. Sierra Leone, *Afzelius! Wilford!* Niger expedition, *Barter!* Accra, *Th. Vogel!* Bagroo River, *Mann!*

The fruit is beaten in a mortar and used for food (Hb. Afzelius).

3. **O. ? sulcatus,** *Hiern.* Puberulous. Leaves oval-oblong, shortly acuminate, oblique and obtuse or subauriculate at the base, thinly coriaceous, glabrate above, 3–6 by $1\frac{1}{4}$–$2\frac{1}{4}$ in., lateral veins about 7–8 pairs; petiole $\frac{1}{6}$–$\frac{1}{5}$ in.; stipules ovate, acuminate or acute, $\frac{1}{4}$–$\frac{3}{8}$ in. long, erect. Racemes axillary, about 1 in. long, several-flowered, puberulous; fruiting pedicels ranging up to $\frac{3}{8}$ in.; bracteoles lanceolate, acuminate, concave. Calyx-teeth 5, subulate from a broad base. Fruit subglobose or pyriform-ellipsoidal, $\frac{2}{3}$–$\frac{3}{4}$ in. diam., 10-sulcate, with longitudinal ribs, glabrate, green, 1–2-celled, crustaceous, tipped with the 5-cleft calyx-limb. Dissepiment membranous. Seeds oval, compressed, white.

Upper Guinea. Sierra Leone, *Afzelius!* called by the natives 'Makuta,' *? Smeathman! Stormont!*

4. **O. rubriflorus,** *Hiern.* A puberulous shrub. Leaves ovate-oblong, acuminate, obliquely rounded at the base, glabrate above, puberulous on the veins beneath, coriaceous, 6–7 by 2–$2\frac{1}{4}$ in., lateral veins about 9–10 pairs; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., puberulous; stipules ovate, erect, $\frac{1}{2}$ in. long, acutely acuminate. Flowers 2 in. long or rather longer, on short pedicels, red tipped with green, about 7 together, in short racemes; bracts and bracteoles lanceolate, subulate, puberulous, concave. Calyx puberulous, $\frac{1}{4}$ in.; teeth subulate from an ovate base, $\frac{1}{8}$ in. long. Corolla puberulous outside; lobes $\frac{5}{8}$ in. long.

Upper Guinea. Abbeokuta, 'growing on *Melia Azedarach*, Linn.' *Barter!*

5. **O. speciosus,** *DC. in Ann. Mus. Par.* ix. p. 218 (1807). A shrub of 12–20 feet or a tree, glabrous in most parts. Leaves oval or oval-oblong, shortly acuminate, obtuse or somewhat wedge-shaped (rarely excavated) at the base, glossy, glabrous except the axils of the 8–9 pairs of lateral veins beneath, firmly chartaceous, 4–9 by $1\frac{1}{2}$–4 in.; petiole $\frac{1}{5}$–$\frac{2}{5}$ in.; stipules lanceolate, acute, $\frac{1}{3}$–$\frac{2}{3}$ in. Flowers $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, on very short pedicels, 20 or more together in short dense simple or somewhat branched axillary racemes; bracts and bracteoles ovate, acuminate, concave, ciliolate or glabrous. Calyx $\frac{1}{6}$ in. long, green; teeth 5, subulate, ciliolate or glabrous. Corolla glabrous, white; lobes $\frac{1}{4}$–$\frac{1}{2}$ in. long. Ovary 2-celled. Fruit ovoid, $\frac{1}{2}$–1 in. long, rounded or somewhat narrowed at the base. Seeds $\frac{1}{3}$ in. long.—DC. Prodr. iv. p. 376; neque Sims nec Ait. nec Lindl.

Upper Guinea. Sierra Leone, *Afzelius! Smeathman!* St. Thomas, *G. Don! Welwitsch!* Senegambia, *Heudelot!* Bonny River, *Mann!* Brass, *Barter!* Old Calabar, *Rev. W. C. Thomson!*

6. **O. querimbensis,** *Klotzsch in Peter's Mossamb. Bot.* p. 292. A glabrous branched shrub of 10 feet with pale branches and shoots. Leaves narrowly elliptical acuminate at both ends, petiolate, dark green above, pale below, 4 by 1 in.; stipules broad below, subulate-acuminate above. Flowers subcorymbose; peduncles short, in the upper axils. Calyx-limb acutely 5-toothed. Corolla white; tube $2\frac{1}{2}$ in. long; lobes $\frac{5}{12}$ in. long, rather acute. Fruit oblong, 2-celled, 1 by $\frac{1}{2}$ in.; seeds oblong, curved, minutely labyrinthiform; testa fibrous.

Mozamb. Distr. Querimba Islands, in sandy stony places, *Peters!*

There is in the Kew Herbarium a specimen, collected by Dr. Kirk on the southern slopes of the Manganja Hills at an elevation of 500 feet, which differs from this species. The leaves measure 4–7 by $1\frac{3}{4}$–$2\frac{1}{2}$ in., and the fruit $1\frac{1}{3}$ by $\frac{2}{3}$ in.; the bracteoles are lanceolate-subulate.

7. **O. formosus,** *Hook. f. in Hook. Ic. Pl.* 785–6 (1848). A glabrous shrub, 10 feet high, erect, not much branched, subherbaceous at the extremities. Leaves oval-oblong, shortly acuminate, obliquely subauriculate at the base, glossy, firmly chartaceous, 8–11 by 3–4 in., lateral veins about 9–10 pairs; petiole about $\frac{3}{8}$ in.; stipules ovate, $\frac{3}{4}$–1 in. Flowers 5–8 in. long, on pedicels of $\frac{1}{2}$–$\frac{3}{4}$ in., in axillary ebracteolate (or obsoletely bracteolate) panicles scarcely equalling the leaves. Calyx $\frac{1}{5}$ in.; limb rather dilated, shorly dentate, green. Corolla white; lobes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Ovary 2-celled.—Benth. in Hook. Niger Fl. p. 387, t. 40–41.

Upper Guinea. Cape Palmas, *Th. Vogel!* Fernando Po, *Mann!*

8. **O. brevifiorus,** *Benth. in Hook. Niger Fl.* p. 388. A glabrous branched shrub, about 6 feet high. Leaves oblong, subacuminate, obliquely subauriculate at the base, coriaceous, 6–10 by 2–$3\frac{1}{2}$ in., lateral veins about 9 pairs; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules ovate, about $\frac{3}{4}$ in. long. Flowers about 1 in. long (or perhaps longer), on pedicels of $\frac{1}{4}$–$\frac{1}{3}$ in., in axillary obsoletely bracteolate or ebracteolate panicles of 2–3 in. Calyx $\frac{1}{6}$–$\frac{1}{4}$ in. long; limb truncate, minutely toothed. Corolla-lobes about $\frac{5}{8}$ in. long. Fruit obovoid, 1 in. long, terete.

Upper Guinea. Fernando Po, *Th. Vogel!*

9. **O. gracilis,** *Hiern.* A slender glabrous branched shrub, 8 feet high. Branches terete, spreading at both 50°, somewhat thickened at the nodes. Leaves oval, acutely acuminate, wedge-shaped at the base, chartaceous, glossy, 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., lateral veins about 6–8 pairs; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules ovate, $\frac{1}{4}$ in. long, tip usually reflexed. Flowers about 2 in. long, on slender pedicels of $\frac{1}{6}$–$\frac{1}{3}$ in., in abbreviated globose lax axillary cymes; bracteoles minute. Calyx green; teeth subulate, acute, rather short. Corolla white; lobes $\frac{5}{8}$ in. long. Ovary 2-celled.

Upper Guinea. Fernando Po, *Mann!*

10. **O ? platystylis,** *Hiern.* A shrub, 12 ft. high, of a pallid rather primrose hue, glabrous except the inflorescence. Branches obtusely 4-sided. Uppermost leaves crowded, obovate or oblanceolate, sessile, subacuminate, not much narrowed, broadly cordate at the base,

membranous, 17–20 by 7–8 in., lateral veins about 17–20 pairs; ? stipules broad, hairy inside. Flowers 4–4½ in. long, fasciculate many together, sessile in the uppermost axils ?, pentamerous. Calyx unequally cleft, puberulous outside, golden-silky inside; lobes lanceolate-subulate, acute, erect. Corolla salver-shaped; tube very slender, gradually funnel-shaped above, puberulous outside and inside; throat not bearded; limb about 1 in. diameter; segments ovate-lanceolate, ciliolate, about ½ by ⅓ in., glabrate inside, spreading or reflexed. Anthers linear, ½ in. long, obtuse at both ends, not locellate, glabrous, sessile, fixed by near the middle of the back, just included. Style glabrous, slender, equalling the corolla-tube; stigma capitate. Ovary 2-celled, fleshy; ovules numerous in longitudinal rows, not immersed in the 2 placentas.

Upper Guinea. Sierra del Crystal, *Mann!*

11. **O. unilocularis,** *Hiern.* A tree, 12–15 ft. high, pilose-hispid on the young parts, &c. Leaves oval or oblong, shortly acuminate, sessile or subsessile, auriculate-cordate at base, membranous, glabrescent except hispidulous veins beneath, 10–20 by 6–11 in. or larger, lateral veins about 12 pairs; stipules ovate, acute, connate at base, 1¼ in., erect. Flowers 4–6 in. long, very slender, numerous, on short pedicels, in much-branched axillary panicles shorter than the leaves, pentamerous. Bracteoles small, subulate. Calyx-limb cup-shaped, green, glabrous or hispidulous except the subulate-filiform subequal teeth of $\frac{1}{10}$ in., or in fruit ranging up to ½ in., persistent. Corolla glabrous, white; lobes lanceolate $\frac{5}{8}$–¾ in. long. Anthers ¼ in. Fruit 1 by ¾ in., rather pointed at apex and crowned by the persistent calyx-limb, slightly narrowed or nearly rounded at base. Seeds ¼–⅓ in. long by $\frac{1}{6}$–$\frac{1}{5}$ in., inserted by the top of the inner horizontal side. Embryo nearly ¼ in. long; radicle ⅛ in.

Upper Guinea. Niger, Jeba on the Quorra, *Barter!* Bonny River, *Mann!*

12. **O. macrophyllus,** *Schweinf. mss. in Herb.* A large tree of 50–60 ft., shortly pilose towards the extremities, glabrate below. Leaves oval or ovate-oblong, shortly acuminate or cuspidate, obliquely excavated or subauriculate at the base, membranous, hispid-strigulose or glabrescent beneath, 12–16 by 5–7 in., lateral veins about 14–16 pairs; petiole ⅓–½ in.; stipules ovate, ⅝–1 in. long, erect. Flowers about 6 in. long, on short pedicels, many together in globose dense axillary panicles of 2–2½ in. diameter (exclusive of the corollas). Bracteoles subulate or small. Calyx ⅓–½ in. long, puberulous; tube turbinate-oblong; teeth 5, filiform, $\frac{1}{6}$–¼ in. long. Corolla glabrous, white or greenish white; lobes ¾ in. long. Anthers 5, ¼ in. long or rather longer, acute. Ovary fleshy, 2-celled; ovules numerous, discoid; stigma fusiform, bifid at the acute tip. Fruit globose, nearly rounded at the base, ½–¾ in. diameter or rather larger; pericarp thick, fleshy-coriaceous. Seeds solitary, ⅓ in., irregularly hemispherical; testa fibrous. Albumen hard-fleshy, copious. Embryo ⅛ in. long; radicle scarcely half as long; cotyledons widely ovate.

Nile Land. Djur-land, *Schweinfurth!* Niamniam-land, *Schweinfurth!*

32. **MITRIOSTIGMA,** Hochst.; Benth. et Hook. f. Gen. Plant. ii. p. 90.

Calyx-tube campanulate; limb slightly wider, deeply 5-lobed; lobes subulate, persistent. Corolla campanulate-oblong or nearly salver-shaped, narrowed above the base, much exceeding the calyx; limb 5-lobed; lobes short, rounded, dextrorsely contorted (as seen from inside). Stamens 5, inserted on the corolla-tube, included or nearly so; anthers sessile, linear, glabrous, dorsifixed. Disk cushion-like, glabrous. Ovary 2-celled (or, by failure of meeting of the 2 placentas above, 1-celled); style filiform, subclavate, exserted, bifid, scarcely mitriform at apex; ovules several (6–12) in each cell, not immersed in the rather fleshy placentas, subpendulous. Berry coriaceous, turbinate at the base, ellipsoidal, subglobose or subfusiform, 2–1-celled; seeds rather large, compressed; testa coriaceous, subfibrous.—Glabrous unarmed shrubs with opposite membranous shortly petiolate leaves, ovate acuminate entire stipules, and rather small or moderate-sized flowers arranged in small axillary bracteolate cymes.

A genus of three species, one endemic in Natal, the other two as follows:—

Leaves 3–5 in. long, nigro-punctate; lateral veins 4–5 . . . 1. *M.? subpunctatum.*
Leaves 4–7 in. long; lateral veins 6–8 . . . . . 2. *M. Barteri.*

The desirability of maintaining this genus seems to me questionable, as the species might be relegated to *Oxyanthus* and *Randia*, unless indeed the partite calyx-limb and the subfibrous texture of the testa be considered good generic characters.

1. **M.? subpunctatum,** *Hiern.* Branches smooth, terete, at the extremities somewhat compressed. Leaves elliptic-oblong, obtusely narrowed or subacuminate at the apex, attenuate at the base, sparingly nigro-punctate above, rather paler beneath, shortly petiolate, 3–5 by 1–1$\frac{7}{8}$ in.; lateral veins about 4–5 pairs, slender; stipules $\frac{1}{6}$–$\frac{1}{5}$ in., persistent, connate at the base, intrapetiolar, rather shorter than the petiole. Bracteoles subulate. Cymes axillary, several-flowered. Fruit solitary, about 1$\frac{1}{2}$ by $\frac{1}{2}$ in., oval, attenuate at the base into a short stalk, 2-celled; cells 4–6-seeded; seeds $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., impressed on the fleshy placentas; testa somewhat fibrous. Calyx-segments (in fruit) apparently 5, lanceolate.

Upper Guinea. Cape Coast, *Hb. Mus. Brit.!*

The flowers being unknown, the genus cannot be satisfactorily determined; the species may possibly belong to *Oxyanthus.*

2. **M. Barteri,** *Hook. fil. in Benth. et Hook. Gen. Plant.* ii. p. 90. A small shrub, 3 ft. high, with subherbaceous branches. Leaves narrowly elliptical, acuminate at both ends, 4–7 by 1–1$\frac{3}{4}$ in., lateral veins about 7–8 pairs; petiole $\frac{1}{6}$–$\frac{3}{8}$ in.; stipules $\frac{1}{6}$–$\frac{1}{4}$ in. long, appressed, subpersistent. Flowers scarcely $\frac{1}{2}$ in. long, shortly pedicellate; bracteoles subulate, appressed. Calyx scarcely $\frac{1}{8}$ in. long, glabrous, green. Corolla campanulate-oblong, glabrous on both sides. Anthers $\frac{1}{4}$ in. long. Ovary 2-celled. Fruit subfusiform, 1–1$\frac{1}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., stipitate at the base, narrowed at the apex. Seeds somewhat angular, $\frac{1}{6}$–$\frac{1}{4}$ in. diameter, of irregular shape.

Upper Guinea. Fernando Po, *Barter!*, (corolla brown) *Mann!*

33. **AMARALIA,** Welw.; Benth. et Hook. f. Gen. Plant. ii. p. 90.

Calyx-tube turbinate at base, shortly produced above the ovary, thickened and silky inside; limb ample, hemispherical or campanulate, 5-partite, persistent; lobes oval, obtuse, coriaceous, sinistrorsely contorted (as seen from inside) in bud. Corolla campanulate, funnel-shaped at base, exceeding the calyx, coriaceous, silky outside, glabrous inside except the densely pilose constriction near the base; lobes 5, rounded, short, reflected, contorted dextrorsely in æstivation. Stamens 5, included, inserted on the corolla-throat; anthers sessile, linear, rather thick, fixed at the back above the base. Ovary 2-celled (or, by failure of meeting of the two placentas, 1-celled); style clavate, sulcate; stigma white, not without difficulty separable into 2 parts; ovules numerous, immersed in vertical rows in the two placentas. Fruit oblong, many-seeded; seeds reticulated.—A scandent unarmed shrub or a tree with subsarmentose branches, opposite evergreen leaves, oblong obtuse stipules and rather large axillary solitary or geminate flowers.

A monotypic genus.

1. **A. bignoniæflora,** *Welw. ex Benth. et Hook. f. Gen. Plant.* ii. p. 91. Puberulous or glabrescent. Leaves elliptical oval or oval-oblong, more or less acuminate, wedge-shaped, rounded or cordate at the base, chartaceous or thinly coriaceous, 2–9 by $\frac{3}{4}$–$4\frac{1}{2}$ in., lateral veins about 6–8 pairs, not conspicuous above; petiole ranging up to $\frac{2}{3}$ in.; stipules caducous, $\frac{1}{3}$–$\frac{2}{3}$ in. long, leaving a hairy line above the scar. Flowers 1–$2\frac{3}{4}$ in. long, fleshy-coriaceous, rigid, purplish; peduncles $\frac{1}{4}$–1 in. long; pedicels when present $\frac{1}{4}$ in.; bracteoles ovate. Calyx-limb $\frac{3}{4}$–1 in. long. Corolla white outside and purple inside, or orange-coloured variegated with purple. Anthers $\frac{1}{2}$ in. long. Fruit 3–4 in. long, $1\frac{1}{4}$–$1\frac{1}{3}$ in. thick, red.—*Gardenia bignoniæflora,* Welw. Apont. p. 585, n. 13 (1859); *G. calycina,* G. Don! Gen. Syst. iii. p. 497, "flowers pale red;" *G. Sherbourniæ,* Hook. Bot. Mag. t. 4044; *Randia Doniana,* Benth.! in Hook. Niger Fl. p. 385; *R. Sherborniæ,* Hook. Niger Fl. p. 385.

Upper Guinea. Sierra Leone, *Afzelius!* and others.
North Central. Monbuttu-Land, *Schweinfurth!*
Nile Land. Niamniam-land, *Schweinfurth!*
Lower Guinea. Angola, Golungo Alto, *Welwitsch!*

34. **MORELIA,** A. Rich. ex DC. Prodr. iv. p. 617 (1830), et in Mém. Soc. Hist. Nat. Par. v. p. 232 (1834).

Calyx-tube campanulate; limb cup-shaped, subtruncate, 5-toothed, persistent. Corolla-tube short, rather exceeding the calyx, cylindrical; throat bearded; lobes 5, spreading, oval, longer than the tube, dextrorsely contorted in æstivation (as seen from inside). Stamens 5, inserted at the mouth of the corolla-tube, exserted, glabrous; anthers linear, shortly apiculate, basifixed; filaments very short. Disk depressed, inconspicuous. Ovary 4-celled; style fusiform, undivided,

glabrous; stigma exserted, sulcate; ovules 2–4 together, impressed on the fleshy placentas. Fruit globose, 4- (–3) celled, rather fleshy; cells sub-chartaceous inside; seeds mostly 2 together, one on each side of a placenta that projects into the cell, sub-compressed; testa thin; embryo curved, nearly half the compass of the seed.—A shrub with subterete branches, opposite petiolate chartaceous or thinly coriaceous leaves, deciduous stipules connate at the base, and rather small flowers in axillary corymbs.

An endemic genus, merged by Bentham and Hooker into *Randia*.

1. **M. senegalensis,** *A. Rich. ex DC. Prod.* iv. p. 617, *et in Mém. Soc. Hist. Nat. Par.* v. p. 232 (1834). An evergreen shrub of 12–30 ft., often arborescent and producing aërial roots, nearly glabrate. Leaves oval or oblong, more or less acuminate, somewhat narrowed at base, thinly coriaceous, $2\frac{1}{2}$–7 by 1–$3\frac{1}{4}$ in.; lateral veins about 5–6 pairs; petiole $\frac{3}{8}$–$\frac{5}{8}$ in.; stipules ovate, ciliolate. Flowers $\frac{1}{4}$–$\frac{1}{2}$ in. long, white or purplish outside, fragrant, on short pedicels, many together in corymbose or hemispherical axillary cymes of 2–3 in. Calyx turbinate-campanulate, $\frac{1}{8}$–$\frac{1}{7}$ in. long, puberulous or glabrate; limb subtruncate, with 5 short broad teeth. Corolla-tube equalling or exceeding the calyx; throat hairy; lobes oblong, obtuse, $\frac{1}{3}$–$\frac{1}{2}$ in. long, spreading or reflexed. Stamens exserted; anthers $\frac{3}{8}$ in. long. Fruit green, $\frac{1}{2}$ in. diameter, 4–3-celled. Seeds $\frac{1}{4}$ in. long or rather more.—Kotschy et Peyr. Pl. Tinn. p. 31, t. 14; *Randia* (sp.), Benth. et Hook. f. Gen. Plant. ii. p. 89.

Upper Guinea. Senegambia, *Leprieur! and Perrottet, Heudelot!* Aboh, *Th. Vogel!* Sierra Leone, *G. Don!* Nupe, *Barter!* Old Calabar River, *Mann!*

Nile Land. Djur-land, *Heuglin, Schweinfurth!* Bongo-land, *Schweinfurth!* Bahr-el-Abiad, fide Schweinf. and Aschers. Enum. p. 282.

Used to intoxicate fish.

35. ZYGOON, *Hiern.*

Calyx small; tube campanulate-turbinate, bracteolate towards the base; limb short, 5-lobed; lobes ovate or rounded, whitish, puberulo-scarious, open in æstivation. Corolla funnel-shaped, glabrous outside or nearly so; tube short, exceeding the calyx, bearded about the throat; lobes 5, spreading, oval, obtuse, bearded at the base inside, longer than the tube, contorted dextrorsely (as seen from inside) in æstivation. Stamens 5, inserted at the mouth of the corolla between its lobes, exserted; filaments short, not quite glabrous; anthers linear, glabrous, about as long as the corolla-lobes and spreading with them, fixed at the back a little above the base. Disk fleshy, annular, glabrous. Ovary 2-celled; ovules 2–3 together, collateral, compressed, pendulous from the apex; placentas small; style exserted, stoutly filiform, glabrous or thinly pubescent below the middle, about twice the length of the expanded flower, subfusiform above, undivided or bidentate at the tip. Fruit unknown.—A small shrub with whitish terete branches, opposite elliptical shortly petiolate rather velvety leaves, ovate, apiculate-acuminate, undivided, rather small stipules, and white,

odorous, subprecocious, small, sessile, hermaphrodite flowers, crowded in dense lateral clusters.

A new monotypic genus, with much the habit of *Empogona*, Hook. f., but differing from it by the absence of style-branches and by the arrangement of the ovules.

1. **Z. graveolens,** *Hiern*. Branches patent or erect-patent, glabrescent; young parts rather velvety. Leaves not fully developed at the time of flowering, somewhat narrowed at both ends, about 1½ by ⅜ in. or smaller, turning blackish green in the dry state. Flowers when expanded ⅛–⅙ in. long, ¼–⅓ in. long just before expansion, of a heavy odour (Dr. Kirk); bracteoles whitish, like the calyx-lobes, small. Calyx $\frac{1}{15}$ in. long. Corolla-tube funnel-shaped; lobes ⅛–⅙ in. long. Style exserted by ¼–⅓ in.

Mozamb. Distr. Zambesi-land, Tette, Shiramba, and at the Shire Cataracts, alt. 500 feet, *Kirk!*

36. **GALINIERA,** Del.; Benth. et Hook. f. Gen. Pl. ii. p. 91.

Calyx small; tube campanulate; limb short, wider, with 5 small teeth, persistent. Corolla subrotate; tube very short; throat pubescent; lobes 5, oval, obtuse, dextrorsely contorted in æstivation as regarded from inside. Stamens 5, inserted at the top of the corolla-tube; filaments very short, flat; anthers linear, glabrous, dorsifixed, acuminate, exserted. Disk inconspicuous. Ovary 2-celled; style deeply bilobed, shortly pilose; lobes compressed, rather dilated; ovules 2, collateral, pendulous from the apex of each cell. Fruit baccate, 2-celled; cells 1–2-seeded. Seeds pendulous, with a small aril; testa plicate adhering to the ruminated albumen; embryo transverse, rather elongated.—A shrub or small tree, with opposite petiolate leaves, deltoid stipules, and rather small flowers in short axillary cymes.

A monotypic genus.

1. **G. coffeoides,** *Del. in Ann. Sc. Nat., ser.* 2, **xx.** p. 92, t. 1, f. 6. Puberulous or nearly glabrous, about 10 feet high. Leaves elliptic-oblong, acuminate at both ends, chartaceous, 4–8 by 1¼–2½ in.; lateral veins about 11–14 pairs; petiole ⅜–½ in.; stipules ¼–⅓ in., acuminate. Flowers ½–⅔ in. diameter. Bracteoles small. Calyx puberulous, ⅛ in. diameter. Stamens and style (including stigmas) about ¼ in. long. Fruit ⅓ in. diameter.—Ferret et Galinier, Voyage en Abyssinie, iii. p. 138, t. 6 (1847); *Pouchetia saxifraga,* Hochst. in. Hb. Schimp. Abyss. ii. n. 863 ("forsan genus distinctum 'Ptychostigma' . . .") (1842); A. Rich. Fl. Abyss. i. p. 355; *Ptychostigma saxifragum,* Hochst. in. Hb. Schimp. Abyss. iii. n. 1586 (1844).

Nile Land. Abyssinia, *Schimper! Roth!, Ferret and Galinier.*

37. **EMPOGONA,** Hook. f.; Benth. et Hook. f. Gen. Pl. ii. p. 94.

Calyx-tube subglobose, densely pubescent; limb deeply lobed; lobes 5 ovate small. Corolla funnel-shaped; tube rather short

densely bearded at the throat; limb 5-partite; lobes ovate-lanceolate, reflexed, as long as the tube, dextrorsely contorted in bud (as seen from inside). Stamens 5, inserted at the mouth of the corolla; anthers linear, glabrous, subsessile, exserted, reflexed with the corolla-limb; connective produced beyond the anther-cells into a linear-spathulate tip. Disk annular, inconspicuous. Ovary 2-celled; style filiform, exserted, with two short divaricate branches, glabrous; ovules in pairs, in one cell sometimes solitary, impressed on the surface of the fleshy placentas, peltately attached. Fruit unknown.—A small hoary-velvety shrub with leafy branches, small opposite leaves, ovate cuspidate stipules, and small axillary pedunculate nodding flowers.

A monotypic genus.

1. **E. Kirkii,** *Hook. f. in Hook. Ic.* t. 1091. Shoots dark-ashy, rather thickened at the crowded nodes. Leaves oval, subacute, obtuse at the base, very shortly petiolate, chartaceous, hoary-velvety, without conspicuous lateral veins, $\frac{5}{8}$–$1\frac{1}{8}$ by $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules $\frac{1}{8}$–$\frac{1}{6}$ in. Peduncles $\frac{1}{8}$–$\frac{1}{4}$ in. long, 1–3 together, 1-flowered; bracts rounded scarious; bracteoles lanceolate, small, occasionally present on the midrib of the peduncle. Flowers $\frac{1}{5}$–$\frac{1}{4}$ in. long. Calyx $\frac{1}{12}$ in. long. Corolla-limb $\frac{1}{3}$ in. diameter. Anthers $\frac{1}{8}$ in. long.

Mozamb. Distr. Lake Nyassa, at Cape Maclear, *Kirk!*

38. **FERETIA,** Del.; Benth. et Hook. f. Gen. Pl. ii. p. 95.

Calyx-tube narrowly campanulate; limb rather unequally 5–4-partite (or dentate); segments (at least in fruit) lanceolate or oblong, apiculate, glabrous. Corolla funnel-shaped, nearly glabrous; tube rather slender exceeding the calyx; limb deeply 5–4-lobed; throat puberulous (or glabrous); lobes oval or oblong, obtuse or subapiculate, dextrorsely contorted in bud as seen from inside. Stamens 5–4, inserted at the mouth of the corolla; anthers narrowly linear, glabrous, sessile, fixed by the back, spreading or recurved. Disk inconspicuous (or fleshy), glabrous. Ovary 2-celled; style slender, exserted, shortly pubescent, entire or bifid (at least) at the apex; ovules about 4 (2–4) together, not immersed in nor impressed on the placentas. Fruit baccate, small, globose, 2-celled, few-seeded. Seeds pendulous, somewhat compressed; testa thin, adhering to the horny albumen, punctulate-rugulose.—Shrubs, puberulous at the extremities with numerous opposite branches, opposite small leaves, ovate stipules, and (often) precocious shortly pedunculate or subsessile (solitary or) subfasciculate flowers, axillary, usually on short lateral shoots.

An endemic genus; if the second species really belongs to it, the character of the genus must be enlarged accordingly, as indicated within brackets.

Peduncles very short in flower	1. *F. apodanthera.*
Peduncle $\frac{1}{4}$–$\frac{3}{5}$ in.	2. *F.? oanthioides.*

1. **F. apodanthera,** *Del. in Ann. Sc. Nat., ser.* 2, xx. p. 92, t. 1, f. 4. Shrub, 4–10 feet high or more. Leaves oval, more or less narrowed

at both ends, glabrescent, chartaceous, shortly petiolate, 1–1½ by ⅖–⅘ in.; lateral veins about 3–4 pairs, not conspicuous; stipules apiculate, about ⅛ in. long, deciduous, imbricated at the base of the lateral shoots. Flowers ⅝–¾ in. long before the spreading of the corolla, weakly fragrant. Peduncles ranging up to ⅙ in. in fruit, shorter in flower. Calyx ⅙ in. long. Corolla-limb about ¾ in. diameter. Anthers ¼ in. Fruit ¼ in. diameter, can be used as a substitute for coffee.—A. Rich. Fl. Abyss. i. 356; *Pavetta elliptica*, Hochst. in Hb. Schimp. Abyss. ii. n. 906 (1842); *Canthium ellipticum*, Hochst. ex Del. in Ferret et Galinier, Voyage Abyss. iii. 136 (1847).

Nile Land. Abyssinia, *Schimper!* and others; Gallabat, *Schweinfurth!* Bongo-land, *Schweinfurth!* Sennaar, near Akaro, *Cienkowsky.*

2. **F.? canthioides,** *Hiern.* A compact bushy shrub, 12 feet high, with slender branches, puberulous and leafy towards the extremities. Leaves elliptical or oval, somewhat pointed or subacuminate, obtusely narrowed or wedge-shaped at the base, chartaceous, glabrate or puberulous, 1–2 by ½–1 in.; lateral veins about 4–5 pairs; petiole 1/12–⅛ in. long, puberulous; stipules ovate, apiculate, nearly equalling or rather exceeding the petiole, minutely ciliolate. Flowers pentamerous, not or scarcely precocious, about ¼ in. when expanded, ⅖ in. just before expansion, glabrous outside, solitary, axillary; peduncles slender, puberulous, ¼–⅗ in. long; bracts linear or narrowly subulate, 1/12–⅛ in. long, inserted on the upper part of the peduncles. Calyx 1/12 in. long; limb short, 5-toothed, persistent, accrescent; teeth reflexed in fruit and then 1/12–1/10 in. long, lanceolate. Corolla puberulous inside near the base; lobes 5, ¼–⅓ in. long. Anthers 5, equalling the corolla-lobes; filaments very short. Disk fleshy, rather conspicuous. Ovary 2-celled; ovules 2–3 together, pendulous, not immersed nor impressed; style exserted, puberulous, bifid; lobes narrowly linear. Fruit ⅕–¼ in. diameter, 2-celled. Seeds pendulous, sometimes solitary.

Upper Guinea. Niger Expedition, at Nupe, *Barter!* Senegambia (*Canthium*, sp. n., Benth. in Hook. Niger Fl. 410), *Heudelot!*

39. **POUCHETIA,** A. Rich.; Benth. et. Hook. f. Gen. Pl. ii. p. 92.

Calyx campanulate persistent with 5 short teeth at the top of the short free portion of the tube. Corolla funnel-shaped; tube short or about twice the length of the calyx; throat glabrous; lobes 5, spreading, oval, about as long as the tube, dextrorsely contorted in bud (as seen from inside). Stamens 5, inserted on the throat of the corolla; anthers subsessile, half-exserted, linear, glabrous, sagittate at the base. Disk fleshy, annular or cushion-shaped, not conspicuous, glabrous. Ovary 1–2-celled (1-celled above, 2-celled below); style rather slender, half cleft, exserted, exceeding the anthers; branches diverging, sulcate; ovules numerous, in 2 or 3 longitudinal rows, not immersed in the 2 placentas, pendulous. Fruit baccate, ellipsoidal, rather small, partly 2-celled, few-seeded. Seeds compressed, some-

what angular, pendulous; testa fibrous-sulcate.—Shrubs or small trees, glabrous or nearly so, with opposite slender leafy branches, opposite chartaceous or thinly coriaceous leaves, ovate or truncate apiculate stipules connate at the base and small flowers in axillary and sometimes also terminal panicles.

An endemic genus.
Flowers $\frac{1}{3}$–$\frac{3}{8}$ in. long, not fasciculate . . . . . 1. *P. africana.*
Flowers $\frac{1}{8}$–$\frac{1}{4}$ in. long, fasciculate . . . . . 2. *P. parviflora.*

1. **P. africana,** *DC. Prodr.* iv. p. 393. A glabrous shrub. Leaves oval or elliptical, obtusely acuminate, rather obtusely narrowed or nearly rounded or rarely wedge-shaped at the base, delicately reticulate at least beneath, 1–4$\frac{1}{2}$ by $\frac{2}{5}$–2 in.; lateral veins about 5–6 pairs; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules $\frac{1}{8}$–$\frac{1}{3}$ in. Flowers $\frac{1}{3}$–$\frac{3}{8}$ in. long, greenish white, fragrant, on short slender pedicels; bracteoles small, ovate, acute. Calyx $\frac{1}{10}$ in. long; teeth ciliolate. Fruit $\frac{1}{3}$–$\frac{1}{2}$ in. long.—A. Rich. in Mem. Soc. Hist. Nat. Par. v. pp. 117, 251 (1834); *Gardenia parviflora*, Smeathman ex DC. l.c., non Poir; *Wendlandia virgata*, G. Don, Gen. Syst. iii. p. 519, n. 20 (1834).

Upper Guinea. Sierra Leone, *Th. Vogel! G. Don! Smeathman!* Senegambia, *Heudelot! Leprieur and Perrottet;* Niger, Borgu, *Barter!* Bagroo River, *Mann!*

Var.? *cuneata.* Leaves wedge-shaped or attenuate at the base, elliptical or lanceolate. Calyx nearly glabrous; teeth minutely ciliolate.

Lower Guinea. Congo, *Chr. Smith!*

Perhaps a distinct species.

2. **P. parviflora,** *Benth. in Hook. Niger Fl.* p. 395. A shrub or small tree, up to 12 feet high, nearly glabrous. Leaves oval, with a prolonged narrow obtuse or rarely acute acumen, obtusely narrowed at the base, 1$\frac{1}{2}$–5 by $\frac{3}{5}$–2$\frac{1}{4}$ in.; lateral veins about 6–8 pairs; petioles $\frac{1}{10}$–$\frac{1}{5}$ in.; stipules $\frac{1}{8}$–$\frac{1}{3}$ in. Flowers $\frac{1}{8}$–$\frac{1}{4}$ in. long (exclusive of the anthers and style-branches), white, subsessile or shortly pedicelled, fasciculate, in puberulous racemose spikes. Calyx puberulous. Corolla-lobes reflexed. Fruit $\frac{1}{4}$ in. long.

Upper Guinea. Fernando Po, *Th. Vogel! Barter!* Prince's Island, *Barter! Mann!*

Scarcely distinct from the previous species, of which it might be regarded as an insular form.

40. **TRICALYSIA,** A. Rich. ex DC. Prodr. iv. p. 445 et in Mém. Soc. Hist. Nat. Par. v. p. 224 (1834). (*Kraussia*, Harv. *Diplocrater*, Hook. f.—Benth. et Hook. f. Gen. Pl. ii. pp. 95, 96.

Calyx-tube turbinate or campanulate, in many species girt at the base with a single or double epicalyx of involucral bracts; limb truncate or shortly dentate or 4–6-lobed, in some species at length cut longitudinally by two opposite slits. Corolla funnel-shaped or shortly salver-shaped; tube short, not many times exceeding the calyx; throat glabrous or bearded; limb usually spreading, deeply lobed; lobes 4–8,

oval or ovate or lanceolate, dextrorsely contorted in the bud as seen from inside, obtuse or apiculate, rarely acute. Stamens 4–8, inserted at the mouth of the corolla, usually exserted, glabrous; filaments short or equalling the corolla-lobes, slender, subulate; anthers linear, fixed at the back rather above the base; connective often produced at the tip into an apiculus or claw. Disk annular, fleshy, glabrous. Ovary 2- or rarely 3-celled; style slender, rather thicker upwards, 2- or rarely 3-lobed; ovules 2–8, collateral or in two longitudinal rows, pendulous, more or less impressed on the fleshy placentas. Fruit pisiform, baccate, coriaceous, 1–2-celled, few-seeded. Seeds obtusely angular or rounded; testa not fibrous.—Erect or climbing shrubs, with opposite t rete or obtusely quadrangular branches, opposite shortly petiolate leaves, short broad apiculate intra-petiolar stipules connate at the base, rather small subsessile or shortly pedicellate axillary flowers, and opposite apiculate bracteoles more or less connate below.

A genus containing a few Natal and Madagascar species besides the following. The Asiatic genus *Diplospora*, DC., seems scarcely to differ.

Calyx-limb 4–6-lobed (*Kraussia*).
- Flowers on pedicels of $\frac{1}{8}$–$\frac{1}{3}$ in. long.
  - Leaves wedge-shaped at the base; lateral veins about 4–5 pairs . . . . . 1. *T. Sonderiana.*
  - Leaves obtusely narrowed or nearly rounded at the base; lateral veins about 6–7 pairs . . . . 2. *T. ovalifolia.*
- Flowers on very short pedicels.
  - Calyx somewhat hairy or at least the lobes ciliolate.
    - Teeth of the epicalyx all small.
      - Leaves rounded at the base. Calyx-lobes roundly ovate, ciliolate . . . . . 3. *T. buxifolia.*
      - Leaves wedge-shaped at the base. Calyx-lobes ovate, densely ciliate . . . . . 4. *T. syrmanthera.*
    - One tooth of the epicalyx in some cases developed into a foliaceous lobe . . . . . 5. *T. bracteata.*
  - Calyx quite glabrous . . . . . 6. *T. congesta.*

Calyx-limb truncate, denticulate or entire or nearly so; in some species at length cut longitudinally by two opposite slits.
- Style more or less hairy (*Diplocrater*).
  - Calyx glabrate. Leaves coriaceous.
    - Tube of calyx not striate . . . . . 7. *T. coriacea.*
    - Tube of the calyx striate (when dry) . . . . . 8. *T. Nyassæ.*
  - Calyx more or less hairy. Leaves thinly coriaceous or chartaceous.
    - Leaves with the transverse tertiary veins clearly marked beneath . . . . . 9. *T. reticulata.*
    - Leaves with the oblique tertiary veins inconspicuous.
      - Corolla-lobes obtuse . . . . . 10. *T. pallens.*
      - Corolla-lobes apiculate or acute.
        - Branches shortly pubescent . . . . . 11. *T. gabonica.*
        - Branches glabrous . . . . . 12. *T. okelensis.*
- Style glabrous.
  - Calyx glabrous . . . . . 13. *T. biafrana.*
  - Calyx puberulous, ciliolate.
    - Flowers pentamerous. Leaves 3–5 in. long . . 14. *T. micrantha.*
    - Flowers hexamerous. Leaves $1\frac{1}{2}$–2 in. long . . 15. *T. microphylla.*
  - Calyx silky (*Rosea*)

Axils of the lateral veins of the leaves hairy. Flowers 3–10 together.	
Leaves more or less narrowed towards the base.	16. *T. niamniamensis.*
Leaves rounded or slightly hollowed at the base	17. *T. djurensis.*
Axils of the lateral veins of the leaves glabrous or nearly so. Flowers 1–3 or few together.	
Corolla-lobes obtuse.	
Leaves more or less pubescent, subchartaceous	18. *T. jasminiflora.*
Leaves nearly glabrous thinly and firmly coriaceous	19. *T. crassifolia.*
Corolla-lobes subacute. Leaves glabrate . .	20. *T. Kirkii.*
(Imperfectly known species	21. *T. angolensis.*)

1. **T. Sonderiana,** *Hiern.* A small glabrous glossy shrub, with pale branches. Leaves elliptical, obtuse or minutely apiculate at the apex, wedge-shaped at the base, coriaceous, shortly petiolate, $1\frac{1}{2}$–$3\frac{1}{3}$ by $\frac{2}{3}$–$1\frac{3}{8}$ in.; lateral veins about 4–5 pairs, inconspicuous, at an acute angle with the midrib; stipules shortly deltoid, apiculate. Flowers pentamerous, $\frac{1}{3}$–$\frac{3}{8}$ in. long, on pedicels of $\frac{1}{4}$–$\frac{1}{3}$ in., about 4 together in sessile or subsessile corymbs. Calyx-limb deeply lobed, glabrous. Corolla-tube glabrous outside; throat densely shaggy; hairs exserted. Fruit $\frac{1}{5}$ in. diam. Style glabrous. Connective produced beyond the anther-cells.—*Kraussia coriacea*, Sonder in Linnæa, xxiii. p. 54 (1850); Harv. et Sond. Fl. Cap. iii. p. 23.

Mozamb. Distr. Zambesia, Luabo River, in fruit, *Kirk!*
Occurs also in Natal.

2. **T. ovalifolia,** *Hiern.* A dense bush, 2 metres high, glabrous, glossy. Branches pale, whitish. Leaves oval, obtuse, obtusely narrowed or nearly rounded at the base, thinly and firmly coriaceous, 2–$3\frac{1}{4}$ by 1–$1\frac{1}{2}$ in.; lateral veins about 6–7 pairs, not conspicuous, at an angle of about 45° with the midrib; petiole very short; stipules shortly ovate with a long rigid apiculus. Flowers pentamerous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, on pedicels of $\frac{1}{8}$–$\frac{3}{8}$ in. long, subsolitary or about 4–6 together in subsessile or sessile corymbs; bracteoles ovate or lanceolate, small. Calyx-limb cleft, glabrous. Corolla-tube glabrous outside; throat densely hairy; lobes obtuse. Anther-tips apiculate. Style glabrous. Fruit $\frac{1}{5}$–$\frac{1}{4}$ in. diam.

Mozamb. Distr. *Zanzibar, Kirk! Hildebrandt!*

3. **T. buxifolia,** *Hiern.* A glabrescent shrub, 3–5 feet high, with cinereous branches. Leaves ovate-oval, subacute or subacuminate, rounded at the base, coriaceous, 1–$2\frac{1}{2}$ by $\frac{1}{2}$–$1\frac{1}{5}$ in.; lateral veins rather close, parallel, inconspicuous; petiole very short; stipules very short with a long rigid apiculus. Flowers pentamerous, pure white, $\frac{3}{8}$ in. long, on very short pedicels, about 4 together, in abbreviated corymbs. Bracts and bracteoles ciliolate. Calyx-limb deeply lobed; lobes ciliolate, roundly ovate. Corolla-throat densely bearded without, hairs not exserted. Anther-tips long, slender. Style glabrous. Fruit $\frac{1}{6}$ in. diam. (perhaps immature).

Lower Guinea. Angola, Ambriz, *Monteiro!*

4. **T. syrmanthera,** *Hiern.* Glabrous except the inflorescence. Branchlets subterete, rather thickened at the nodes. Leaves elliptical, acuminate, rather wedge-shaped at the base, thinly coriaceous, 5–6 by 2–2¼ in.; lateral veins about 4 pairs; tertiary veins transverse, slender; petiole ¼ in.; stipules subtruncate apiculate. Flowers about ¼ in. long, shortly pedicellate, in short dense axillary cymes; bracteoles shortly pubescent, the uppermost usually not cup-shaped. Calyx-limb short, rather broad, deeply 4–6-lobed; lobes ovate, obtuse, densely ciliate. Corolla glabrous outside; throat pubescent; limb 4–5-partite; lobes oval-oblong, scarcely acute, not acuminate. Anthers 4–5, long-acuminate; filaments rather short. Style glabrous. Ovules about 2 together, impressed on the fleshy placentas, collateral.

Upper Guinea. Sierra Leone, *Afzelius!*
Diplospora, DC., appears to be congeneric with this species.

5. **T. bracteata,** *Hiern.* Glabrous except the inflorescence. Branchlets subterete, rather thickened at the nodes. Leaves elliptical, acuminate, rather obtuse at the base, thinly coriaceous, about 4 by 1¾ in.; lateral veins about 4 pairs; tertiary veins transverse, not conspicuous; petiole ⅙ in.; stipules truncate, with a long rigid apiculus. Flowers about ⅕ in. long, subsessile, in dense very short axillary and lateral panicles. Bracteoles puberulous, cup-shaped, constituting an epicalyx, often with a lanceolate foliaceous lobe of ¼–⅓ in. developed on one side. Calyx puberulous outside, small; limb deeply 5–6-lobed; lobes ovate, ciliolate. Corolla glabrous outside, throat bearded; lobes 5, subapiculate. Anthers apiculate. Style glabrous. Ovules 2–5 together.

Upper Guinea. Senegambia, *Heudelot!*

6. **T. congesta,** *Oliv. in Journ. Linn. Soc. Lond.* xv. p. 95, *sub* Kraussiâ. Glabrous. Branchlets somewhat compressed towards the extremities. Leaves elliptical, narrowed towards both ends, obtuse, subsessile, thinly coriaceous, paler beneath, 3–3½ by 1–1½ in.; lateral veins about 5 pairs, inconspicuous, net-veins marked above; stipules much apiculate from a subtruncate short base, ⅙–⅕ in. long. Flowers ¼ in. long, shortly pedicellate, about 5–6 together, in short axillary bracteolate subsessile clusters; upper bracteoles forming a single shortly lobed calyculus; lower bracteoles often calyculate with one larger foliaceous lobe. Calyx-limb deeply 5-cleft, broader than the ovary; lobes rounded. Corolla-lobes 5, equalling the tube; throat densely bearded. Anthers 5, connective produced into a narrow claw. Style glabrous, bifid. Ovules about 4 together.

South Central. Lake Tanganyika, *Cameron!*

7. **T. coriacea,** *Hiern.* Glabrous. Leaves oval, shortly acuminate, rounded or somewhat narrowed at the base, coriaceous, 3–7 by 1¼–3 in.; lateral veins about 5–6 pairs, depressed above; petiole ⅛–¼ in.; stipules subtruncate, with a long acumen. Flowers about ¼ in. long, subsessile, in axillary clusters. Bracteoles cup-shaped,

glabrous. Calyx turbinate, subtruncate, obscurely toothed. Corolla white, glabrous outside, coriaceous; throat densely bearded; lobes 5–8, subobtuse, not acuminate. Anthers apiculate or obtuse. Style hairy; stigmas 2–3. Ovules 4–5 together. Berry 1–3-seeded, 1–2-celled; pericarp thick.—*Randia coriacea*, Benth. in Hook. Niger Fl. 387; *Diplocrater* (sp.), Benth. et Hook. f. Gen. Pl. ii. p. 96.

Upper Guinea. Niger, Grand Bassa, *Th. Vogel!* Gaboon River, *Mann!*
Lower Guinea. Congo, *Chr. Smith!*

8. **T. Nyassæ,** *Hiern.* A glabrous shrub, with pale glossy roundedly 4-sided branches. Leaves oval, subacuminate, somewhat narrowed at the base, coriaceous, 3–4½ by 2–2½ in.; lateral veins about 5 pairs; tertiary veins transverse; petiole ¼–⅜ in.; stipules subtruncate, with long rigid acumen. Flowers ⅓ in. long, subsessile, in axillary clusters; bracteoles cup-shaped, glabrous or ciliolate. Calyx truncate, somewhat striate when dry, glabrous. Corolla-tube glabrous outside, funnel-shaped; throat densely bearded; lobes 6, subobtuse, puberulous outside. Anthers subapiculate; filaments rather short. Style pubescent. Ovules 6–8 together.

Mozamb. Distr. West shore of Lake Nyassa, *Kirk!*

9. **T. reticulata,** *Hiern.* A shrub or small tree, glabrous except the inflorescence. Leaves elliptical, acuminate, more or less narrowed not attenuate at the base, thinly coriaceous, 2–6 by ¾–2¼ in.; lateral veins about 5–6 pairs; tertiary veins transverse; petiole ⅛–⅓ in.; stipules subtruncate, with a long apiculus. Flowers ¼–⅓ in. long, shortly pedicellate, in abbreviated axillary panicles; bracteoles cup-shaped, shortly pubescent, the uppermost forming an epicalyx. Calyx truncate, 1/10–⅛ in. long, shortly pubescent, with 4–5 subulate teeth. Corolla-tube glabrous outside, pubescent inside and at the throat; lobes 6–8, apiculate, rather hairy towards the tip. Anthers apiculate, often with minute tufts of hairs at the tip. Ovules 4–6 together. Style somewhat hairy. Fruit glabrate, ⅕ in. diam., crowned by the persistent cup-shaped puberulous calyx-limb of about 1/10 in. in length.—*Randia reticulata*, Benth. in Hook. Niger Fl. 386; *Diplocrater* (sp.), Benth. et Hook. f. Gen. Pl. ii. p. 96.

Upper Guinea. Sierra Leone, *Afzelius! Th. Vogel! G. Don!* Senegambia, *Heudelot!* Bagroo River, *Mann!*
Lower Guinea. Congo, *Chr. Smith!*

10. **T. pallens,** *Hiern.* Branchlets puberulous. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, pallid, glabrescent, 3–4½ by 1¼–2 in.; lateral veins about 5–6 pairs, very slender; petiole ⅙ in.; stipules very short, truncate, apiculate. Flowers subsessile, crowded in very short axillary clusters; bracteoles cup-shaped, shortly pubescent. Calyx turbinate, shortly pubescent, 1/12 in. long, truncate, obscurely toothed. Corolla ⅙–⅓ in. long, funnel-shaped, shortly pubescent outside except the tube; throat bearded; lobes 5–6, obtuse. Anthers obtuse; filaments of moderate length. Style hairy. Ovules 2 together.

Upper Guinea. Fernando Po, *Mann!*

11. **T. gabonica,** *Hiern.* A shrub with shortly pubescent branches. Leaves oblanceolate, shortly acuminate, subapiculate, wedge-shaped at the base, chartaceous, glabrescent except the midrib, 1¼–3 by ½–1 in.; lateral veins about 5 pairs, inconspicuous; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules very short, with an apiculus of $\frac{1}{12}$–$\frac{1}{8}$ in. Flowers small, subsessile, 3–6 together, axillary. Calyx hairy outside, subtruncate, with 5 small teeth. Epicalyx single or nearly so. Corolla-tube glabrous outside; lobes 5, apiculate. Filaments short or long. Ovules 2 together. Style hairy.

Upper Guinea. Gaboon River, 1° N. lat., *Mann!*

12. **T. okelensis,** *Hiern.* A shrub, 20 ft. high; branches glabrous, rather pale. Leaves narrowly elliptical or somewhat lanceolate, scarcely acuminate, attenuate at the shortly petiolate base, thinly coriaceous, glabrous, 4–5 by 1⅓–2 in.; lateral veins about 4–5, usually with little pits in the axils; tertiary veins oblique, not conspicuous; stipules short, subtruncate, apiculate, persistent. Flowers 5–7-merous, rather larger than is usual in this genus, on very short pedicels, several together, in axillary clusters. Calyx shortly pubescent, subtruncate, calyculate at the base; limb persistent. Corolla-lobes narrow, acute, ⅓–⅜ in. long, longer than the tube; throat bearded. Anthers ¼ in. long. Style 2–3-cleft, somewhat hairy above. Ovary apparently 2–3-celled with a few ovules together. Berry ¼ in. diam. yellow, at length red, glabrate except the persistent calyx-limb which is about ⅛ in. long, 2–3-celled or, by the addition of spurious (?) dissepiments, with more cells. Seeds 1–9, angular; testa finely granulated; albumen white.—*Iasianthus okelensis*, Schweinfurth in Herb.

Nile Land. Djur-land, by Okel, *Schweinfurth!*

13. **T. biafrana,** *Hiern.* A glabrous shrub of 12 ft. or a small tree of 20 ft. Branches smooth, black or ashy. Leaves oval-ovate acuminate, rather abruptly wedge-shaped at the base, thinly coriaceous, glossy, 4–7 by 1⅝–2¾ in.; lateral veins about 6–7 pairs; tertiary veins transverse; petiole ⅓ in.; stipules short, truncate, with an apiculus of $\frac{1}{6}$–¼ in. long. Flowers about ¼ in. long, shortly pedicellate, numerous, on dense abbreviated axillary and lateral panicles. Bracteoles cup-shaped, ciliolate, constituting an epicalyx. Calyx truncate, glabrous. Corolla glabrous except the bearded throat, lobes 6–5, apiculate. Anthers versatile; filaments long, shortly apiculate. Style glabrous. Ovules 2 together.

Upper Guinea. Ambas Bay, *Mann!* Cameroon Mountains, alt. 500 ft., *Mann!* Old Calabar River, *Mann!*

14. **T. micrantha,** *Hiern.* A nearly glabrous shrub, with rather slender branches. Leaves oval, shortly and obtusely acuminate, obtuse at the base or nearly so, thinly coriaceous, glabrous, shining, shortly petiolate, 3–5 by 1¼–2½ in.; lateral veins about 4–5 pairs; stipules subtruncate, (shortly) apiculate. Flowers ⅕ in. long, subsessile, about 3–6 together, in abbreviated axillary panicles; bracteoles

cup-shaped, puberulous, ciliolate. Calyx truncate, puberulous, 5-toothed. Corolla-lobes 5, puberulous outside, glabrous inside, oval, apiculate; throat obsoletely bearded. Anthers minutely apiculate; filaments rather short. Style glabrous. Ovules 2 together, collateral.

Upper Guinea. Gaboon River, 1° N. lat., *Mann!*

15. **T. microphylla,** *Hiern.* A dense nearly glabrous bush, 3–4ft. high. Branches ashy, smooth, terete and glabrous except the somewhat compressed puberulous extremities. Leaves elliptical, obtuse at the apex, wedge-shaped at the shortly petiolate base, glabrous, shining, rather thinly coriaceous, slightly paler beneath, $1\frac{1}{2}$–2 by $\frac{3}{5}$–1 in.; lateral veins about 4 on each side, inconspicuous; stipules short, apiculate. Flowers hexamerous, $\frac{1}{3}$–$\frac{3}{8}$ in. long, a few together, subsessile, in very short axillary clusters; epicalyx truncate, puberulous, with opposite apiculate teeth. Calyx puberulous; tube exceeding the ovary, truncate, with 6 narrow teeth. Corolla salver-shaped, glabrous outside; throat thinly pubescent; lobes ovate, acute. Anthers exserted, narrowly linear, not apiculate. Style glabrous.

Mozamb. Distr. Island Zanzibar, *Hildebrandt!*

16. **T. niamniamensis,** *Schweinf. mss. in Herb.* A puberulous shrub with straight branches. Leaves narrowly elliptical or lanceolate, subacuminate to the obtuse apex, more or less narrowed towards the base, glabrescent except the 3–4 pairs of puberulous principal veins and the tufts of hairs in their axils, thinly coriaceous, $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{1}{3}$–$1\frac{1}{3}$ in.; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules depresso-deltoid, apiculate. Flowers $\frac{1}{4}$–$\frac{1}{3}$ in. long, sweet-scented, 3–10 together, subsessile, axillary. Calyx- $\frac{1}{12}$–$\frac{1}{10}$ in. long, silky outside, shortly cut. Epicalyx simple or nearly so. Corolla-tube glabrous outside; lobes 5, obtuse, hirsute outside. Ovules 2, collateral in each cell. Style glabrous. Berry shortly pubescent, $\frac{1}{6}$ in. diam.—*Rosea* (sp.), T. Thoms. in Speke, Journ., App. p. 636; *Tricalysia?* (sp.), Oliv. in Trans. Linn. Soc. Lond. xxix. p. 89.

Nile Land. Niamniam-land, *Schweinfurth!* at Madi, *Speke and Grant!*

Differs from *Bunburya capensis*, Meissn., by the hirsute not glabrous backs of the corolla-lobes.

A specimen from the banks of the Luinha River in Angola, where it was found by Dr. Livingstone to be cultivated as coffee, according to a note of Dr. Welwitsch, may belong to this species; it has elliptical leaves 4–$4\frac{1}{2}$ by $1\frac{1}{2}$–$1\frac{2}{3}$ in. and a hexamerous corolla. A fragment of the plant was communicated to Dr. Welwitsch in December, 1854, in whose herbarium I have seen it.

17. **T. djurensis,** *Schweinf. mss. in Herb.* A puberulous shrub, 15–20 ft. high. Leaves ovate-oval, subobtuse, rounded or slightly excavated at the base, thinly coriaceous, glabrescent except the puberulous midrib and the small tufts of hairs in the axils of the principal veins, 1–$2\frac{1}{2}$ by $\frac{2}{3}$–1 in.; lateral veins about 3–5 pairs, inconspicuous; petiole very short; stipules deltoid, apiculate. Flowers $\frac{3}{8}$ in. long, subsessile, 3–6 together, axillary. Calyx $\frac{1}{8}$ in. long, shortly silky, obscurely 5-toothed. Epicalyx single. Corolla greenish;

tube glabrous outside; lobes 5 rarely 6, obtuse, glabrous inside or nearly so. Style glabrous. Ovules 2 together. Fruit 1-seeded, red, about $\frac{1}{3}$ in. diam.

Nile Land. Djur-land, *Schweinfurth!*

18. **T. jasminiflora,** *Benth. et Hook. f. Gen. Plant.* ii. p. 95. A puberulous or sub-velutinous shrub, about 5 ft. high or more, erect or climbing. Leaves narrowly elliptical or ovate, more or less narrowed at both ends, apiculate, acute or obtuse at the base, membranous or subchartaceous, shortly pubescent especially beneath, $1\frac{1}{2}$–5 by $\frac{2}{3}$–2 in.; lateral veins about 4–5 pairs, not conspicuous; margins flat; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules $\frac{1}{12}$–$\frac{1}{8}$ in. long, with scarious truncate margin and a finely subulate apiculus $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long, subsessile, 1–3 together, lateral, often appearing in the axils of the old leaves before the development of the new ones, 6–8-merous, white, silky-tomentose outside. Epicalyx double, each with 2 opposite decussate erect apiculi. Calyx slit down on two opposite sides. Corolla-lobes $\frac{1}{4}$–$\frac{3}{8}$ in. long, obtuse; tube hirsute. Filaments slender, glabrous, short or rather long. Style glabrous. Ovules 2–4 together. Berry red.—*Rosea jasminiflora*, Klotzsch in Monatsb. Acad. Wiss. Berl. 1853, p. 502, et in Peters Mossamb. Bot. t. 45.

Mozamb. Distr. Zambesia, Sena, *Peters!* Moramballa, *Kirk!* River Ruo, junction with Shire, Bishop Mackenzie's grave, *Kirk!* Manganja Hills, *Meller!*

19. **T. crassifolia,** *Benth. et Hook. f. Gen. Plant.* ii. p. 95. A shrub with robust branchlets, puberulous at the extremities; bark ashy. Leaves elliptic-oblong, subacuminate, obtuse or apiculate, wedge-shaped at the shortly petiolate base, dark green and glabrescent above, pale and glabrate beneath except short hairs along the midrib and the 4–5 pairs of slender lateral veins and their axils, thinly and firmly coriaceous, $2\frac{1}{2}$–4 by $\frac{3}{5}$–1 in.; margins revolute; stipules intrapetiolar, with a short broad connate base and an equalling or longer subulate apiculus. Flowers crowded or few together in axillary abbreviated clusters. Epicalyx usually double; teeth all small. Calyx truncate, split, silky. Corolla-lobes obtuse, wrinkled at least in the dry state, $\frac{1}{4}$ in. long, glabrous inside. Style glabrous.—*Rosea crassifolia*, Klotzsch in Monatsb. Akad. Wiss. Berl. 1853, p. 502, et in Peters Mossamb. Bot. t. 46.

Mozamb. Distr. By the Sena River, *Peters!*

20. **T. Kirkii,** *Hiern.* A bush, 4 ft. high, with glabrescent branches. Leaves oval-oblong, obtusely or subacutely narrowed towards both ends, apiculate, glabrescent, thinly coriaceous, pale beneath, $2\frac{1}{4}$–$4\frac{1}{4}$ by $\frac{3}{4}$–$1\frac{1}{2}$ in.; lateral veins about 4–6 pairs, not conspicuous, impressed above; petiole $\frac{1}{12}$–$\frac{1}{8}$ in.; stipules $\frac{1}{16}$ in. long, truncate, with setaceous apiculus $\frac{1}{6}$–$\frac{1}{3}$ in. long. Flowers about $\frac{1}{4}$ in. long, white, subsessile, 3 together, axillary. Calyx silky outside, $\frac{1}{5}$ in. long, splitting up. Epicalyx single or nearly so, puberulous. Corolla-tube

glabrous outside, rather exceeding the calyx; lobes 6, subacute. Ovules 5–6 together. Style glabrous.

Mozamb. Distr. River Shire at Tingane, *Kirk!*

The following species, the type of the genus, is not known to me; the characters given do not enable me to place it in the clavis.

21. **T. angolensis,** *A. Rich. ex DC. Prodr.* iv. p. 445 (1830), *et in Mém. Soc. Hist. Nat. Par.* v. p. 225 (1834). A shrub. Leaves linear-lanceolate, gradually narrowed at the base. Stipules broad, acuminate. Flowers crowded, pubescent. Calyx-limb 5–6-dentate, rather broad. Corolla-throat naked; limb 5–6-partite; lobes narrow. Stamens exserted; filaments short. Stigmas 2, linear, rather short, somewhat recurved. Ovary 2-celled; cells 2-ovuled; ovules collateral.

Lower Guinea. Angola.

41. **GUETTARDA,** L.; Benth. et Hook. f. Gen. Plant. ii. p. 99.

Calyx-tube campanulate or globose; limb cup-shaped, truncate or toothed, deciduous. Corolla salver-shaped; tube cylindrical, much exceeding the calyx, rather slender; throat naked or thinly bearded; limb spreading; lobes 4–9, imbricate. Stamens 4–9, inserted on the tube of the corolla, sessile or subsessile; anthers linear, fixed at the back rather above the base, included or half exserted. Ovary 4–9-celled; cells distant, 1-ovuled; funiculus thickened; style filiform; stigma subcapitate, slightly lobed, included or shortly exserted. Fruit globose, drupaceous; flesh scanty; putamen woody, 4–9-celled; cells narrow. Seeds straight or curved; testa membranous; albumen wanting or scanty; radicle elongated.—Shrubs or trees with opposite leaves, intrapetiolar deciduous stipules, and hermaphrodite or polygamo-dicecious flowers, sessile, secund, on the branches of opposite axillary cymes.

A genus of about 45 species, chiefly inhabiting tropical America.

1. **G. speciosa,** *Linn.! Sp. Pl.* edit. i. p. 991. A robust shrub or small tree, somewhat gummy; young parts velvety. Leaves oval rotund or obovate, obtuse at both ends, often subcordate at the base, chartaceous or subcoriaceous, glabrate above, 4–10 by $2\frac{1}{2}$–6 in.; lateral veins about 7–10 pairs; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in.; stipules broadly ovate, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Flowers 1–$1\frac{1}{2}$ in. long, fragrant. Calyx-limb truncate. Corolla white; limb $\frac{3}{4}$–1 in. diam., half cleft; lobes rounded; tube silky outside; throat thinly hairy. Anthers $\frac{1}{8}$ in. long. Fruit $\frac{2}{3}$–1 in. diameter; mesocarp fibrous.—Lindl. Bot. Reg. t. 1393 (1831); DC. Prodr. iv. p. 455; Benth. Fl. Austral. iii. p. 419.—*Cadamba jasminiflora,* Sonn. Voy. Ind. iii. p. 253, t. 128 (1782).

Mozamb. Distr. *Zanzibar, Kirk!* East Coast of Africa, *Forbes!*

Found on maritime coasts in Madagascar, Johanna, the Seychelles, and throughout the East Indies to the Pacific Islands and Australia.

This plant is quite exceptional amongst tropical African Rubiaceæ inasmuch as in the fruit the endocarp is very hard woody and more or less lobed, the mesocarp hard and fibrous, and in the seed the embryo is entirely destitute of albumen.

42. **CREMASPORA,** Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 108.

Calyx pubescent; tube small, campanulate or turbinate; limb 5 (–6)-cleft, teeth lanceolate, acute, persistent. Corolla funnel-shaped; tube short; throat more or less hairy; lobes 5 (–6), contorted dextrorsely in the bud (as seen from inside). Stamens 5 (–6), inserted at the mouth of the corolla-tube; filaments very short; anthers narrowly linear, apiculate, glabrous, fixed at the back slightly above the base, exserted. Disk inconspicuous. Ovary 2-celled; style filiform, more or less hairy, shortly pubescent; stigma narrowly fusiform, undivided; ovules solitary, suspended by the inner side of the apex. Berry rather small, ellipsoidal, 2-celled, usually 2-seeded. Seeds pendulous, oblong, somewhat compressed; testa thin, transversely striate; albumen horny, not ruminated; embryo small, axile; cotyledons ovate; radicle terete, superior. — Pubescent shrubs with supra-axillary branches, opposite shortly petiolate leaves, those below the branches in one species smaller rounder and more or less cordate, intrapetiolar cuspidate or acute stipules, rather small flowers in short axillary clusters, and bracteoles similar to the calyx-lobes.

A small genus containing a species from Madagascar, one from the Cape de Verd Islands (which I have not seen), and the following:—

Pubescent or nearly glabrate	1. *C. africana.*
Hirsute-hispid	2. *C. ? Thomsoni.*

1. **C. africana,** *Benth. in Hook. Niger Fl.* p. 412. A pubescent shrub, sometimes subscandent or drooping, with supra-axillary spreading subterete branches. Leaves oval or oblong or slightly obovate (or those below the base of the branchlets cordiform or subreniform), acuminate, usually obtuse at the base, glabrate above, pubescent at least on the principal veins beneath, chartaceous, $1\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{3}{4}$–2 in.; the cordiform or subreniform ones $\frac{1}{4}$–$1\frac{1}{2}$ in. diam.; lateral veins about 3–5 pairs; margins narrowly revolute; petiole $\frac{1}{8}$–$\frac{1}{4}$ in., pubescent; stipules lanceolate-acuminate from a broad base, $\frac{1}{6}$–$\frac{1}{3}$ in. long, hairy along the back outside, glabrous inside. Flowers white, fragrant, about $\frac{1}{4}$–$\frac{3}{8}$ in. long, subsessile, 2–6 together. Calyx $\frac{1}{8}$–$\frac{1}{6}$ in. long, pubescent outside; teeth 5, lanceolate or ovate, acute, erect. Corolla-lobes 5, about $\frac{1}{6}$–$\frac{1}{3}$ in. long, shortly pubescent outside or nearly glabrate, obtuse. Style exserted, pubescent. Berry $\frac{1}{3}$ in. long, ellipsoidal.—*Psychotria triflora,* Thonn. in Schum. Pl. Guin. 108; *Cremaspora heterophylla,* F. Didr. in Copenhag. Vidensk. Medd. 1854, p. 187, n. 5; *Coffea hirsuius,* G. Don, Gen. Syst. iii. p. 581.

Upper Guinea. Niger, *Barter!* a pretty ornamental plant; blossoms abundant; Asiama, *Thonning;* Cape Coast; Sierra Leone, *G. Don!* Succonde, *Hove!* in Hb. Afzel. and Banks.

North Central. Monbuttu-land, *Schweinfurth!*

Nile Land. Bongo-land and Djur-land, *Schweinfurth!*

Mozamb. Distr. Zanzibar, *Hilsenberg and Bojer! Kirk!*

2. **C. ? Thomsoni,** *Hiern.* A scandent shrub, with brown stem. Branches terete, glabrescent or especially at the extremities tawny-

hirsute. Leaves oval, subacuminate, rounded at the base, chartaceous, glabrate above, hirsute at least on the midrib beneath, $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in.; lateral veins about 5–6 pairs, clearly marked beneath, rather patent; petiole $\frac{1}{8}$ in. long, hirsute; stipules subulate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, hirsute. Flowers 5–6-merous, white, (in bud) $\frac{1}{4}$–$\frac{1}{3}$ in. long, sessile, a few (3–1) together, in very abbreviated axillary clusters. Bracteoles subulate, small, at the base of the calyx, thinly pubescent. Calyx pilose-hirsute especially at the base; limb 5–6-toothed, glabrous inside; teeth subulate. Corolla silky outside, glabrous inside except the pubescent throat; lobes 5–6, $\frac{1}{5}$ in. long, lanceolate-oblong, not acute, with longitudinal veins; tube apparently short. Anthers 5–6, linear, inserted at the throat of the corolla, subsessile, fixed at the back near the base. Fruit deep red.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

43. POLYSPHÆRIA, Hook. f. in Benth. et Hook. f. Gen. Plant. ii. p. 108.

Calyx-tube small, turbinate or campanulate; limb cup-shaped, truncate or shortly 4-dentate, persistent. Corolla funnel-shaped; tube short; throat densely bearded; lobes 4, contorted dextrorsely (as seen from inside) in æstivation, sometimes very narrowly so. Stamens 4, inserted at the mouth of the corolla-tube, included; filaments very short; anthers linear, apiculate, fixed at the back near the base, glabrous. Disk small, fleshy. Ovary 2-celled; style filiform, exserted, shortly pubescent; stigma undivided, fusiform; ovules solitary, suspended by the inner side of the apex. Berry rather small, globose, coriaceous, 1–2-celled, 1–2-seeded. Seeds rounded; testa striate-sulcate; albumen ruminated; embryo small; cotyledons rounded, flat; radicle superior.—Glabrous pubescent or pilose shrubs with supra-axillary branches, opposite elliptical leaves having divaricate lateral veins, sometimes the leaves below the branches suborbicular and cordate, apiculate supra-axillary stipules from a broad base, small flowers in axillary clusters, and small cup-shaped bracteoles.

A small genus confined to Nile land, Mozambique and the Comoro Islands. The species are very closely related.

Calyx truncate, glabrous . . . . . 1. *P. multiflora.*
Calyx shortly 4-dentate, pubescent or puberulous.
Leaves mostly lanceolate or narrowly elliptical, clusters of flowers shortly pedunculate . . . . . 2. *P. lanceolata.*
Leaves mostly oval or ovate. Clusters of flowers sessile.
Petiole pubescent. Leaves $\frac{3}{4}$–$2\frac{1}{2}$ in. . . . . 3. *P. parvifolia.*
Petiole glabrous. Leaves $2\frac{1}{2}$–4 in. . . . . 4. *P. Schweinfurthii.*

Polysphaeria? ligustriflora, Vatke in Linnæa xl. 193 (1876), Hb. Schimp. Abyss. ann. 1863, nn. 1110 and 1471, belongs to the genus *Olinia*, Thunb. (Lythraceæ), which is the true *Plectronia*, Linn.

1. **P. multiflora,** *Hiern.* A glabrous shrub. Leaves oval or slightly obovate or those below the branchlets subrotund, obtuse, sometimes mucronulate, rounded or somewhat wedge-shaped at the

base, thinly coriaceous, 1½–4 by 1–1½ in.; lateral veins about 6–7 pairs; petiole ⅛–⅜ in. Flowers ⅕ in. long, sessile, many together, in dense sessile axillary clusters. Calyx truncate, glabrous outside. Corolla-lobes obtuse; throat densely bearded.

Mozamb. Distr. About 26 miles up River Rovuma, *Kirk and Meller!* Monfia, Zanguebar Coast, *Sir B. Frere!*

2. **P. lanceolata,** *Hiern.* A small glabrous shrub, with subterete branches. Leaves lanceolate or narrowly elliptical, acute, apiculate, mostly wedge-shaped at the base, thinly coriaceous, glossy, 1¾–3½ by ⅗–1⅕ in.; lateral veins about 8 pairs; petiole ⅙–⅓ in.; stipules short, very caducous, from a broad base. Flowers ⅕–¼ in. long, sessile or subsessile, crowded, about 6 together on shortly pedunculate axillary clusters; peduncles ⅙–⅛ in. Calyx with 4 short teeth, puberulous. Corolla glabrate outside; throat densely bearded; lobes rounded, shorter than the tube. Berries 1–2 together, globose, glabrous, ¼–⅓ in. diam. Albumen much ruminated.

Mozamb. Distr. Shupanga, *Kirk!*

Var.? *obtusior.* Leaves ranging up to 4 by 1⅓ in., rather obtuse at both ends, not or scarcely apiculate. Peduncles ranging up to ¼ in. Differs from *P. Schweinfurthii* by the presence of common peduncles.

Mozamb. Distr. Right bank of Luabo, *Dr. Kirk!*

3. **P. parvifolia,** *Hiern.* A shrub, about 6 or 7 feet high, with glabrescent obscurely 4-sided branches and puberulous supra-axillary branchlets. Leaves oval or ovate, obtuse or acute, sometimes subacuminate, rounded or subcordate at the base, or those below the branchlets suborbicular and cordate, thinly coriaceous, glabrate above, pubescent or glabrescent on the midrib beneath, ¾–2½ by ½–1 in.; lateral veins 4–6 pairs; petiole 1½–⅙ in., pubescent; stipules apiculate from a depresso-deltoid base, short, pubescent outside. Flowers ⅙–⅕ in. long, subsessile, 3–5 together, in sessile axillary clusters. Calyx pubescent outside; limb shortly 4-dentate. Corolla pubescent outside; lobes 4, obtuse, short; throat densely bearded. Berry ¼ in. diam.

Mozamb. Distr. Zanzibar, *Kirk! Hildebrandt!* in barren places.

Var.? *glabra.* Glabrous. Leaves narrowly elliptical or ovate-oblong. Berry glabrous, ¼ in. diam.

Mozamb. Distr. Bagamoyo, Zanguebar, *Kirk!*

4. **P. Schweinfurthii,** *Hiern.* A shrub, 20 feet high, much branched, glabrous in most parts. Branchlets subterete. Leaves oblong-ovate, narrowed to the usually obtuse apex, rounded or subcordate at the base, thinly coriaceous, glossy, 2½–4 by ⅞–1⅝ in.; lateral veins about 7–9 pairs, patent; petiole glabrous, ⅒–⅙ in.; stipules fugacious. Berries 1–2 together, glabrous, ¼ in. diam., sessile or subsessile, 2-celled; endocarp thin papery, whitish; seeds hemispherical; albumen of the genus. Fruiting calyx persistent, puberulous, 4-toothed.

Nile Land. Bongo-land, *Schweinfurth!*

A specimen from **Mozamb. Distr.**, Zanzibar, glabrous, with a fruit ⅜ in. diam. and leaves obtuse-based ranging up to 5 by 2 in., somewhat resembles this species, but is not sufficient for determination.

44. **BELONOPHORA,** Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 109.

Calyx small; tube campanulate, 4-bracteolate at base; limb campanulate, deeply 4–5-lobed; lobes rounded, ciliolate. Corolla salver-shaped; tube rather slender, gradually and slightly dilated upwards, appressedly pubescent; throat glabrous; limb spreading, 5-partite; segments oblong, nearly as long as the tube, dextrorsely contorted in æstivation (as seen from the inside). Stamens 5, inserted on the corolla-tube, included; anthers sessile, linear, apiculate, glabrous, fixed by the back near the middle. Disk fleshy, cushion-shaped. Ovary 2-celled; style included, glabrous, deeply branched; branches 2, papillose, somewhat diverging, subulate; ovules solitary, pendulous, anatropous. Fruit globose, coriaceous, 2-celled, dissepiment thin. Seeds solitary, pendulous; hilum minute, ventral, towards the apex; testa firm; albumen horny; embryo minute, curved, inverted towards the apex of the seed; cotyledons small, cordate; radicle terete, next the hilum.—A glabrous tree with opposite leaves, long subulate taper-pointed deciduous stipules, and fasciculate sessile flowers.

A monotypic genus.

1. **B. coffeoides,** *Hook. f. Ic. Pl.* 1127 (1873). A tree, 40 feet high, with subterete pale branches, somewhat enlarged at the nodes. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, rather pale, 4–8 by $1\frac{1}{2}$–3 in.; lateral veins about 10 pairs; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules lanceolate, $\frac{3}{4}$ in. long. Flowers about $\frac{1}{2}$ in. long. Bracteoles small rounded. Fruit globose, $\frac{1}{2}$–$\frac{5}{8}$ in. diam.

Upper Guinea. Island St. Thomas, alt. 3000 ft., *Mann!*

45. **AULACOCALYX,** Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p 109.

Calyx oblong, silky on both sides; tube short, 5-sulcate; limb 5-cleft; teeth subulate, erect. Corolla narrowly funnel-shaped; tube silky outside; throat glabrous; limb spreading, 5-partite; segments oblong, dextrorsely contorted (as seen from the inside) in æstivation. Stamens 5, inserted at the mouth of the corolla, exserted; anthers sessile, linear, subapiculate, glabrous, fixed by the back near the middle. Disk annular. Ovary 2-celled; style exserted, filiform, sparingly hispid below, glabrous and bifid at apex; branches short, spreading, obtuse; ovules solitary, pendulous. Fruit unknown.—A shrub with glabrescent opposite leaves, lanceolate caducous stipules, and sessile fasciculate bracteolate flowers, lateral and terminating short branches.

A monotypic genus.

1. **A. jasminiflora,** *Hook. f. Ic. Pl.* 1126 (1873). Height 15 feet. Branches rather pale, terete, glabrescent. Leaves elliptical, caudate-acuminate, wedge-shaped at the base, chartaceous, ranging up to $4\frac{1}{2}$ by $1\frac{7}{8}$ in.; lateral veins 3–4 pairs, slender, depressed above; petiole about $\frac{1}{8}$ in.; stipules $\frac{1}{4}$ in. long, puberulous. Flowers about 1 in.

long. Calyx $\frac{3}{8}$ in. long; hairs pale golden. Bracteoles ovate or lanceolate, acute, imbricated, shorter than the calyx.

Upper Guinea. Mount John River, Kongui, lat. 1° N., *Mann!*

46. **LAMPROTHAMNUS,** Hiern.

Calyx-tube cup-shaped, bracteolate at the base; bracteoles calyculate; limb shortly cleft; lobes 4–5, rounded, imbricated in bud. Corolla funnel-shaped, deeply 6–7-fid; tube exserted, cylindrical below, funnel-shaped above; throat pubescent; lobes spreading, oval, contorted dextrorsely (as seen from within). Stamens 6–7, exserted, inserted at the mouth of the corolla; filaments short, glabrous; anthers narrowly linear, apiculate, fixed at the back a little above the base, versatile, glabrous or slightly puberulous at the back. Disk annular, fleshy, glabrous. Ovary 2–1-celled; style glabrous below; stigma thicker, exserted, elongate-clavate, pubescent, bifid or bidentate, lobes pointed; ovules solitary, pendulous from a thickened funicle. Fruit . . . . — Shrubby. Leaves opposite, subsessile, cordate, lucid, thinly coriaceous, with interpetiolar ovate apiculate stipules. Flowers hermaphrodite, white, fragrant, rather large, in dense subterminal corymbs.

A new monotypic genus.

1. **L. zanguebaricus,** *Hiern.* Glabrous except the inflorescence. Branches robust, obtusely quadrangular, smooth, pallid, leafy above. Leaves oval, obtuse, veiny, 2–4 by 1–2 in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. long, exceeding the petiole. Flowers before expansion $\frac{2}{3}$–$\frac{3}{4}$ in. long, and as much in diameter when expanded. Corymbs $1\frac{1}{2}$–2 in. diam.; common peduncle $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts connate, ovate, not large. Calyx $\frac{1}{6}$ in. long, glabrous outside, ciliolate, shortly hairy inside. Corolla-tube $\frac{1}{4}$ in. long; lobes $\frac{3}{8}$ in. long. Anthers $\frac{1}{3}$ in. long. Style $\frac{1}{2}$ in.—Hook. Ic. Pl. 1220.

Mozamb. Distr. Zanzibar coast, at Dar Salam, *Kirk!*

47. **RHABDOSTIGMA,** Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 109.

Calyx small; tube campanulate; limb 5-dentate. Corolla subrotate; tube short, funnel-shaped; throat bearded; limb spreading, 5-partite; segments ovate-lanceolate, dextrorsely contorted in æstivation (as seen from the inside). Stamens 5, inserted on the throat of the corolla, glabrous, exserted; filaments very short, subulate; anthers linear, acute. Disk annular. Ovary 2-celled; dissepiment thin; style columnar, glabrous; stigma narrowly club-shaped, 10-sulcate, with 10 narrow membranous wings; ovules solitary, pendulous, compressed; funicle short, not thickened. Fruit unknown.—A small glabrous tree with 4-sided branches, opposite leaves, ovate apiculate interpetiolar stipules, and rather small bracteolate pedicellate flowers in axillary lax panicles.

A monotypic genus.

Octotropis, Bedd. an Indian monotypic genus differs from this only by a 1-celled ovary, 5–4-merous flowers, and 8-sulcate and 8-alate stigma.

1. **R. Kirkii,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* ii. 109. Branches glossy. Leaves elliptical, narrowed at both ends, thinly coriaceous, 3–4 by $1\frac{1}{4}$–$1\frac{3}{4}$ in.; lateral veins about 8 pairs, inconspicuous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules $\frac{1}{4}$ in. long, from a broad base. Flowers $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender; panicles 3–5 in. long; bracteoles small, subulate. Calyx glabrous. Corolla glabrous outside.

Mozamb. Distr. Quiloa, *Kirk!*

48. **PENTANISIA,** Harv.; Benth. et Hook. f. Gen. Pl. ii. p. 104.

Calyx-tube campanulate, at length globose; limb unequally 5–4-partite; segments more or less elongated, subfoliaceous, subpersistent. Corolla-tube elongated, slender, funnel-shaped above; throat pubescent or shaggy; lobes 5–4, oval or ovate, obtuse, valvate in the bud. Stamens 5–4, glabrous, inserted on the throat of the corolla, included or exserted; filaments short or obsolete; anthers linear-oblong, fixed at the back near the base. Disk fleshy, glabrous. Ovary 2- (very rarely 3-) celled; style solitary (or very rarely two), slender, glabrous, equalling or exceeding the corolla, entire or bifid; stigma simple or subcapitate; ovules solitary, pendulous from the top, anatropous. Fruit small, indehiscent, subglobose, composed of 2 (or very rarely 3) cartilaginous pyrenes. Seeds discoid, dorsally compressed; umbilicus apical, minute; testa thin; albumen fleshy; embryo nearly the length of the albumen and nearly as thick, compressed, radicle superior, ovate; cotyledons cordiform rather longer and broader than the radicle.—Erect or ascending herbs from a woody perennial stock, with opposite leaves, cleft stipules connate with the petiole or leaf-base, and dimorphic lilac flowers of moderate size clustered in terminal heads or, after flowering, forming spikes.

A genus of two or more species occurring in Natal or in other eastern districts of the Cape Flora, and of the following.

Pentanisia sp., T. Thoms. in Speke, Journ., App. p. 636, is an Asclepiad, *Margaretta rosea*, Oliv.

1. **P. Schweinfurthii,** *Hiern.* Dwarf herb 3–6 in. high. Stems simple or branched, partially pubescent. Leaves oval or oblong, obtuse, narrowed to the sessile base, glabrous, subcoriaceous, pale green on both sides, $\frac{3}{4}$–$1\frac{1}{2}$ by $\frac{1}{6}$–$\frac{2}{5}$ in.; stipules 2–3 cuspidate, $\frac{1}{6}$–$\frac{1}{5}$ in. long. Flowers about half an inch long, sessile, in branched heads. Calyx-tube shortly and closely pubescent with pale hairs; lobes spathulate lanceolate or oblong, obtuse or acute, puberulous, the longer ones $\frac{1}{12}$–$\frac{1}{10}$ in. long. Corolla pale lilac, glandular-puberulous outside, the upper ones with exserted anthers, the lower ones with anthers included in the down of the throat; lobes 5–4, about $\frac{1}{12}$ in. long. Style solitary (in one flower two styles occurred), very slender; stigma bifid or entire. Ovary and fruit 2- or very rarely 3-celled. Fruit $\frac{1}{8}$ by $\frac{1}{10}$ in., puberulous. Seed $\frac{1}{10}$ in. long. Embryo $\frac{1}{16}$ in. long.

Nile Land. Dar Fertit, *Schweinfurth!*

Closely allied to the South African species but differs by the obtuse leaves and puberulous shorter calyx-lobes without hispid hairs.

49. **CANTHIUM,** Lam. Encycl. Méth. i. p. 602 (1783).—(*Plectronia,* DC.; Benth. et Hook. f. Gen. Pl. ii. p. 110; non Linn! nec Lour.)

Calyx-tube short, turbinate campanulate or hemispherical; limb short, 4–5-toothed or -cleft or subtruncate, deciduous. Corolla coriaceous; tube rather short, exceeding the calyx, glabrous outside, hairy with a ring of deflexed pilose hairs or rarely glabrous inside; throat rather constricted or dilated, often bearded; lobes 4–5 rarely 6, ovate or lanceolate, reflexed, usually glabrous, valvate in æstivation (towards the apex sometimes induplicate-valvate). Stamens 4–5 rarely 6, exserted, inserted at the mouth of the corolla; filaments short; anthers ovate or oval or lanceolate, acute or obtuse, usually subsagittate at the base, usually glabrous, fixed at the back. Ovary 2-celled, fleshy; style flexuous, filiform or robust, exserted or equalling the corolla, usually glabrous; stigma capitate, calyptriform or mitre-shaped, sometimes bifid at the tip, often sulcate; ovules solitary, pendulous, anatropous. Fruit drupaceous, didymous or subdimidiate or globose, 2-celled or by abortion 1-celled; pyrenes 2–1, sometimes subrugose. Seeds pendulous, solitary, nearly straight or curved, sometimes bent into the form of a horse-shoe round the placenta; testa membranous; albumen fleshy, sometimes ruminated; embryo terete, nearly straight or curved, axile; cotyledons short; radicle superior.—Shrubs or trees, sometimes scandent, occasionally spinous, with opposite leaves and branches, acuminate stipules from a broad base, and axillary flowers crowded in short panicles or fascicles.

A rather large genus widely spread over the tropical regions of the Old World, the Cape of Good Hope and Australia.

Corolla glabrous or sparingly setose outside. Flowers 5–4-merous.
- Peduncles fasciculate or pedicels in simple umbels or two or more racemes on a common peduncle. Spinous or unarmed. Flowers 5-merous. Disk glabrous.
  - Spinous.
    - Spines $\frac{1}{3}$–$\frac{1}{2}$ in. long. Leaves about 1 in. long. Flowers $\frac{1}{10}$ in. long. . . . . 1. *C. glaucum.*
    - Spines 1 in. long. Leaves 2–3 in. long. Flowers $\frac{1}{4}$–$\frac{3}{8}$ in. long. . . . . 2. *C. Thonningii.*
  - Unarmed.
    - Corolla-lobes setose outside. Leaves more or less hispid . . . . . 3. *C. setiflorum.*
    - Corolla-lobes glabrous. Leaves glabrous or puberulous.
      - Common peduncles very short or obsolete.
        - Branches erect-patent.
          - Leaves quite glabrous, more or less lucid.
            - Fruit obovoid, somewhat narrowed towards the base.
              - Leaves coriaceous . . . . . 4. *C. nitens.*
              - Leaves chartaceous . . . . . 5. *C. neglectum.*
            - Fruit globose or didymous, rounded or hollowed at the base . . . . . 6. *C. Schimperianum.*
          - Leaves puberulous, not or scarcely shining 7. *Vatkeanum.*
        - Branches patent

Corolla-lobes obtuse . . . . . 8. *C. anomocarpum.*
Corolla-lobes acute . . . . . 9. *C. acutiflorum.*
Corolla-lobes caudate-acuminate . . 10. *C. caudatiflorum.*
Common peduncles ½ in. long . . . . . 11. *C. horizontale.*
Pedicels paniculate. Usually unarmed. Flowers 4–5-merous. Disk hairy or glabrous.
Inflorescence zigzag, divaricately branched. Occasionally spinous . . . . . 12. *C. discolor.*
Inflorescence spreading, 1-fruited. Unarmed . . . 13. *C. oligocarpum.*
Inflorescence subglobose, dense, not zigzag. Unarmed. Fruits numerous.
Style pubescent (except the variety) . . . . . 14. *C. zanzibaricum.*
Style glabrous.
Stigma calyptriform, much exserted.
Flowers 5-merous.
Leaves narrowed at the base.
Branches slender, terete. Lateral veins of the leaves about 4–6 pairs . . . 15. *C. gracile.*
Branches rather slender, subterete. Lateral veins of the leaves about 7–9 pairs . . . . . 16. *C. Heudelotii.*
Branches robust, angular. Lateral veins of the leaves about 7–8 pairs . . . 17. *C. polycarpum.*
Leaves rounded or hollowed at the base, or nearly so.
Disk glabrous.
Glabrous. Branches erect-patent . . 18. *C. glabriflorum.*
Hairy. Branches spreading . . . . 19. *C. Cornelia.*
Disk more or less hispid.
Hairs on the leaves or branches pilose-hispid.
Branchlets hispid . . . . . 20. *C. hispidum.*
Branchlets glabrous . . . . . 21. *C. setosum.*
Hairs on the leaves or branches short. 22. *C. subcordatum.*
Glabrous except the inflorescence, or nearly so.
Calyx-teeth hairy.
Leaves not reddish, but paler beneath . . . . . 23. *C. congense.*
Leaves reddish on both sides when dry . . . . . 24. *C. rubens.*
Calyx-teeth glabrous . . . . . 25. *C. fœtidum.*
Flowers 4-merous.
Tertiary veins of the leaves inconspicuous.
Leaves turning neither red nor black in the dry state, glabrous, usually wedge-shaped at the base . . . . 26. *C. Afzelianum.*
Leaves turning reddish in the dry state, not black.
Pubescent. Leaves wedge-shaped at the base . . . . . 27. *C. Barteri.*
Glabrescent except the inflorescence.
Leaves rounded at the base or nearly so.
Calyx-tube hairy . . . . . 28. *C. nervosum.*
Calyx-tube glabrous or nearly so . 29. *C. Mannii.*
Leaves (young) turning black when dry, not reddish . . . . . 30. *C. lividum.*
Tertiary veins of the leaves conspicuous on

the lower surface . . . . . 31. ***C. venosum.***
Stigma globose, not much exserted.
Peduncles very short, glabrous.
Leaves oblong-ovate, acute . . . . . 32. ***C? multiflorum.***
Leaves oval, obtuse . . . . . 33. ***C. bibracteatum.***
Peduncles ½–1 in. long, puberulous or glabrate 34. ***C. crassum.***
Corolla tomentose outside. Flowers 4–6-merous.
Corolla-lobes 5, lanceolate, caudate-acuminate. Anthers glabrous . . . . . 35. ***C. vanguerioides.***
Corolla-lobes 4–6, narrowly lanceolate, not caudate.
Anthers slightly hairy . . . . . 36. ***C. lanciflorum.***

1. **C. glaucum,** *Hiern.* Glabrous. Branches rigid, terete, glaucous, spinous; spines opposite, strong, spreading, situated above very abbreviated leafy lateral shoots, $\frac{1}{3}$–$\frac{1}{2}$ in. long, acute, glaucous. Leaves oval, scarcely subacuminate, obtuse at both ends or wedge-shaped at the base, chartaceous, pale beneath, $\frac{1}{2}$–$1\frac{1}{4}$ by $\frac{1}{5}$–$\frac{3}{4}$ in.; lateral veins about 4–6 pairs, inconspicuous; petiole rather thin, narrowly winged towards the apex, $\frac{1}{8}$–$\frac{1}{6}$ in. long; stipules apparently subulate. Flowers about $\frac{1}{10}$ in. long, on slender pedicels of $\frac{1}{8}$–$\frac{1}{6}$ in., several together in dichotomous subfasciculate racemes, shorter than the leaves. Calyx glabrous; limb 5-cleft; lobes obtuse. Corolla-tube glabrous outside, pubescent inside, rather dilated towards the mouth; limb deeply 5-lobed, rotate. Filaments very short; anthers ovate. Disk glabrous. Stigma capitate or subglobose; style equalling the corolla, glabrous, robust.

Nile Land. Sola River, Somali Coast, *Kirk!*
Mozamb. Distr. Zambesi-land, Tette, *Kirk!*
Habit of the Cape *Plectronia spinosa*, Kl., but differs by the bearded throat of the corolla; also like the Indian *Canthium parviflorum*, Lam., but differs by its pentamerous flowers.

2. **C. Thonningii,** *Benth. in Hook. Niger Fl.* p. 410. A much branched shrub, 6 feet high or more. Branches terete, ashy-white, spinous; spines supra-axillary, opposite, subulate, 1 in. long, patent. Leaves ovate, subacuminate, very shortly petiolate, except the midrib inconspicuously veined; 2–3 in. long; stipules acuminate. Peduncles solitary, opposite, divided into two quite simple racemes scarcely as long as the leaves; flowers pedicellate, distichous, alternate, one pedicellate flower in the fork of the peduncle; bracteoles 2, small, at the base of the bifurcation. Calyx turbinate, acutely 5-toothed. Corolla campanulate, $\frac{1}{4}$–$\frac{3}{8}$ in. (size of *Convallaria majalis*, L.) long, greenish white, 5-cleft; lobes acute, revolute. Stigma capitate-conical, bifid at the tip, on a level with the anthers.—*Phallaria spinosa*, Schum. et Thonn. Beskr. Guin. Pl. p. 113.

Upper Guinea. Guinea, rather rare, *Thonning.*

3. **C. setiflorum,** *Hiern.* A rigid unarmed shrub, with patent terete glaucescent branches and hispid shoots. Leaves oval-oblong, apiculate, usually obtuse at the base, subcoriaceous, hispidulous or glabrescent above, hispid especially on the midrib beneath, shortly petiolate, $\frac{1}{2}$–$1\frac{3}{4}$ by $\frac{1}{6}$–$\frac{1}{2}$ in.; lateral veins about 3–5 pairs, not conspicuous; stipules from a broad base lanceolate or subulate, somewhat

hairy outside. Flowers hermaphrodite, about $\frac{1}{10}$ in. long, 5–7 together, on rather slender hispid pedicels of $\frac{1}{6}$–$\frac{1}{5}$ in., umbellately arranged on a hispid common peduncle ranging up to $\frac{1}{5}$ in. or fasciculate. Calyx hispid; limb spreading, 5-toothed; teeth subulate, sometimes prolonged. Corolla reddish in the dry state, 5–4-lobed; lobes obtuse, setose-hispid above near the apex; throat bearded, rather dilated. Stamens 5–4. Disk glabrous. Ovary 2-celled; style about equalling the ovary, glabrous, robust. Stigma capitate; ovules roundish, pendulous.

Mozamb. Distr. Near Tette, *Kirk!*

4. **C. nitens,** *Hiern.* A glabrous shining unarmed shrub. Branches subterete erect-patent, ashy, thickened at the nodes. Leaves oval, much acuminate, wedge-shaped at the base, glossy, coriaceous, $1\frac{1}{2}$–4 by $\frac{1}{2}$–$1\frac{2}{3}$ in., rarely smaller; lateral veins about 4–6 pairs, inconspicuous; petiole $\frac{1}{8}$–$\frac{3}{8}$ in.; stipules from a broad base apiculate, about $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers very numerous, on pedicels of $\frac{1}{5}$–$\frac{1}{3}$ in., umbellately arranged on a very abbreviated common peduncle. Calyx-tube turbinate, glabrous; limb small, obscurely 5 ?-toothed; teeth ciliolate. Disk glabrous. Fruit obovoid-oblong, somewhat compressedly pyriform, $\frac{3}{8}$–$\frac{2}{5}$ in. long, 1–2-celled, on pedicels of the same length or rather longer.

Upper Guinea. Niger, near River Nun (flowers greenish), *Barter!*

5. **C. neglectum,** *Hiern.* Glabrous large tree-like unarmed shrub, rather lucid, with elongated erect-patent rather ashy terete branches, somewhat compressed towards the extremities. Leaves elliptical, acuminate, wedge-shaped or partly obtuse at the base, chartaceous, of nearly the same colour on the two surfaces, 3–4 by 1–$1\frac{1}{2}$ in.; lateral veins about 6–7 pairs, inconspicuous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules connate, sheathing, subulate-apiculate, intra-petiolar, hairy inside, $\frac{1}{8}$–$\frac{1}{4}$ in. long. Fruiting pedicels $\frac{1}{4}$ in. long, rather slender, fasciculate, several together in the axils of fallen leaves. Fruit $\frac{1}{4}$ in. long, obovoid, obliquely narrowed at the base. Calyx-limb short, after the fall of the corolla with minute subulate teeth. Ovary and ovules of the genus.

Nile Land. Abyssinia, 7000—8000 feet alt., *Schimper!*

6. **C. Schimperianum,** *A. Rich. Fl. Abyss.* i. p. 350. A nearly glabrous unarmed arborescent shrub; branchlets somewhat compressed at the extremities, not quite patent. Leaves ovate or lanceolate, obtuse, wedge-shaped at the base, glabrous, rather pale green on both sides especially below, glossy above, thinly coriaceous, 1–$2\frac{1}{2}$ by $\frac{1}{4}$–$1\frac{1}{4}$ in.; lateral veins about 3–5 pairs, inconspicuous; petiole $\frac{1}{12}$–$\frac{1}{6}$ in., glabrous; stipules ovate or lanceolate-subulate, subobtuse, glabrous $\frac{1}{6}$–$\frac{1}{5}$ in. long. Flowers $\frac{1}{5}$ in. long, yellow, on slender puberulous or nearly glabrous pedicels of $\frac{1}{5}$–$\frac{3}{8}$ in., several together, umbellately placed on a very short common peduncle. Calyx-limb campanulate, glabrous; limb subtruncate or obscurely toothed. Corolla glabrous outside; tube hairy inside; lobes 5, ovate, subobtuse. Disk glabrous. Style curved, about

as long as the corolla when straightened, glabrous. Stigma far exserted, mitriform, terete, bifid at tip. Fruit $\frac{1}{4}$ in. long, obscurely marked with transverse wrinkles, subdidymous or one half abortive; seeds and embryo curved round the placentas through half a circle; albumen uniform.—*Phallaria Schimperi*, Hochst. in Hb. Schimp. Abyss. i. n. 328 (1840); *Plectronia Schimperi*, Hochst. in Hb. Schimp. Abyss. iii. n. 1900 (1844); *Canthium lucidum*, Br. in Salt, Abyss. p. lxii., name only, non Schldt., nec Hook. et Arn.; *Plectronia Schimperiana*, Vatke in Linnæa, xl. p. 195, n. 12 (1876), *ex parte.*

Nile Land. Abyssinia, *Schimper!* i. 328, iii. 1900; (1853) 174; (1854) 2240; (1862) 232; 5500–7000 feet alt.; Amba Sea; Tigre-name 'Zadak.' *Salt!*

7. **C. Vatkeanum,** *Hiern.* A long puberulous unarmed shrub, with erect-patent terete branches, somewhat compressed at the extremities, with abbreviated axillary shoots giving the branches a fasciculated appearance. Leaves elliptic-oblong, acuminate, more or less wedge-shaped at the base, chartaceous, scattered with very short hairs above, paler and softly puberulous beneath, 2–3$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{6}$ in.; lateral veins about 7–8 pairs, not conspicuous; stipules connate, sheathing, apiculate, intra-petiolar, about $\frac{1}{8}$–$\frac{1}{6}$ in. long; petiole closely puberulous, $\frac{1}{8}$–$\frac{1}{4}$ in. long. Fruiting pedicels fasciculate, about $\frac{1}{8}$ in. long, several together at the nodes. Fruit about $\frac{1}{3}$ in. long, subdidymous. Calyx-limb after the fall of the corolla truncate, very short, glabrous. Disk glabrous. Ovary ovules and embryo of the genus.—*P. Schimperiana*, Vatke in Linnæa, xl. p. 195, n. 12 (1876), *ex parte.*

Nile Land. Abyssinia, at the river Repp, 7000–8000 feet alt., *Schimper!*

8. **C. anomocarpum,** *DC. Prodr.* iv. p. 475. A glabrous glossy unarmed shrub, about 10 feet high, with long rambling spreading branches. Leaves oval, obtusely acuminate or subacute, more or less wedge-shaped at the base except the suborbicular leaves at the base of the branchlets, thinly coriaceous, of nearly the same colour on the two surfaces, 1$\frac{1}{2}$–4 by $\frac{3}{4}$–2 in.; lateral veins about 4–5 pairs, inconspicuous; petiole very short; stipules subulate from a broad base, $\frac{1}{5}$ in. long. Flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, on slender glabrous pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. (lengthening in fruit to $\frac{3}{8}$–1$\frac{1}{4}$ in.), umbellately arranged on very short solitary common peduncles. Calyx very small, glabrous except the 4–5 small puberulous spreading teeth. Corolla glabrous outside, with deflexed closely appressed hairs below the apex; lobes ovate, obtuse; throat scarcely bearded. Disk elevated, annular, glabrous. Fruit $\frac{1}{4}$–$\frac{1}{3}$ in. long, didymous or subdimidiate, 2-, or by abortion 1-celled; pericarp fleshy. Seeds and embryo curved through half a circle in a vertical plane (regarding the placenta as a horizontal axis); albumen uniform.

Upper Guinea. Sierra Leone, *Smeathman* ex DC. l.c. *Afzelius!* Senegambia, Albreda, *Perottet and Leprieur*, *Heudelot!* Niger, *Th. Vogel!* Nupe, *Barter!* Lagos Island, *Barter!*

9. **C. acutiflorum,** *Hiern.* A climbing shrub of 15–20 feet, or a tree, unarmed, quite glabrous except the flowers, shining. Branches

subterete or obtusely 4-sided, patent; the branchlets somewhat compressed. Leaves oval, mostly acuminate, nearly rounded or somewhat narrowed at the base, thinly coriaceous, 2–4 by 1–2 in., sometimes those at the base of the branchlets smaller; lateral veins about 4–5 pairs, prominent beneath; petiole spreading, $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules cuspidate-subulate from a broad subtruncate base, $\frac{1}{8}$ in. long. Flowers $\frac{1}{5}$ in. long, on pedicels of $\frac{1}{6}$–$\frac{1}{5}$ in. long, many together, umbellately arranged on a short common peduncle. Calyx-tube widely campanulate, glabrous; limb very small, 5-toothed, glabrous. Corolla-tube glabrous outside, hairy with deflexed hairs inside; throat bearded; lobes 5, ovate-lanceolate, acute, thinly pubescent inside. Filaments reflexed, exserted, anthers lanceolate. Disk glabrous. Stigma elongate-calyptriform.

Upper Guinea. Cameroon Mountains, alt. 500 feet, *Mann!* Old Calabar, *Rev. W. C. Thomson!*

10. **C. caudatiflorum,** *Hiern.* Glabrous, shining, unarmed. Branches subterete, patent; branchlets subcompressed. Leaves elliptical, acuminate, wedge-shaped at the base, thinly coriaceous, of the same rather yellowish-green colour on both sides when dry, $1\frac{1}{3}$–4 by $\frac{2}{3}$–$1\frac{2}{3}$ in.; lateral veins about 3–5 pairs, not conspicuous; petiole $\frac{1}{12}$–$\frac{1}{8}$ in.; stipules apiculate-subulate from a broad subtruncate base, short. Flowers about $\frac{1}{6}$ in. long when expanded, pentamerous, on rather slender glabrescent pedicels of about $\frac{1}{8}$ in., about 6 together, umbellately arranged on a very short puberulous or glabrescent common peduncle; bracteoles minute. Calyx glabrous or very nearly so; tube shortly campanulate; teeth subulate, small, spreading. Corolla-tube glabrous outside, with deflexed hairs inside; throat glabrous; lobes lanceolate, caudate-acuminate, glabrous, spreading or reflexed. Anthers narrowly lanceolate, exserted, reflexed; filaments recurved. Disk glabrous. Stigma exserted, elongate-calyptriform. Fruit small, oval, clustered, shortly stalked, red, sweet.

Upper Guinea. Sierra Leone, *Afzelius!*

The description of the fruit is taken from a manuscript note in the herbarium of Afzelius.

11. **C. horizontale,** *Schum. Guin. Pl.* p. 112 *sub* Phallaria, *non Benth.* Unarmed. Stem woody, terete, branched; branchlets horizontal, terete, striate, glabrous. Leaves ovate-elliptical, subacuminate, shortly petiolate, glabrous, rather glossy; stipules interpetiolar, lanceolate, acute. Peduncles axillary, solitary, $\frac{1}{2}$ in. long; pedicels umbellately arranged from the top, $\frac{1}{3}$ in. long, 1-flowered. Calyx minute, 5-toothed, glabrous; lobes erect, rather acute. Corolla tubular, 5-cleft; tube three times the length of the calyx; lobes lanceolate, acute, rather patent, reflexed; throat shaggy inside with a ring of reflexed whitish hairs below the middle. Filaments filiform, $\frac{1}{12}$ in. long, inserted on the throat under the incisions of the corolla; anthers oval. Ovary globose, rather depressed; style filiform, equalling the corolla; stigma conical-calyptriform, truncate.

Upper Guinea. Guinea (without precise locality).

I have seen no specimen that I can refer to this description.

12. **C. discolor,** *Benth. in Hook. Niger Fl.* p. 409. A shrub or small tree; branchlets rufous-pubescent; branches divaricate, elongated, glabrate, spinous or unarmed; spines axillary, opposite or 3 in a whorl, patent, subulate, acute, $\frac{2}{3}$–1 in. long. Leaves oval, obtusely acuminate, obtusely narrowed at the base, glabrate except the midrib, dark above, whitish beneath, chartaceous, 1–3 by $\frac{5}{8}$–$1\frac{1}{2}$ in.; lateral veins about 4–6 pairs; petiole shortly pubescent, $\frac{1}{10}$–$\frac{1}{5}$ in.; stipules subulate, $\frac{1}{8}$–$\frac{1}{4}$ in. long, puberulous or glabrate. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, on short slender puberulous pedicels arranged in divaricately branched tortuous shortly pedunculate panicles of $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Calyx-tube small, hemispherical, puberulous or glabrate; limb wider, deeply 5-lobed, glabrous; lobes deltoid, obtuse, spreading. Corolla glabrous outside, tubular; tube strigose with deflexed white hairs near the base inside; lobes 5, reflexed, ovate, scarcely acute. Disk prominent, glabrous. Anthers about equalling the filaments. Stigma exserted, calyptriform; style slender, glabrous. Fruit $\frac{1}{3}$–$\frac{2}{5}$ in. long, subdidymous or, by abortion of one cell, oblique; seeds curved round the placentas.

Upper Guinea. Sierra Leone, *G. Don! Afzelius!* and others; Senegambia, *Heudelot!* Bagroo River, *Mann!*

13. **C. oligocarpum,** *Hiern.* A large glabrous tree-like shrub, unarmed. Branches ashy, terete, somewhat compressed towards the extremities, patent. Leaves elliptical, obtusely acuminate, nearly rounded or somewhat wedge-shaped at the base, thinly coriaceous, paler beneath, $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{2}$–1 in.; lateral veins about 4 pairs, inconspicuous, often with a glandular pit in the axil; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. stipules ovate, acuminate, about $\frac{1}{8}$ in. long. Infructescence about 1 in. long, axillary or in the axils of fallen leaves, spreading, 1-fruited; bracteoles minute. Fruit oblique, $\frac{2}{3}$ in. long, rounded at both ends, very unequally 2-celled, 1-seeded, crowned by the minute remains of the 5-toothed calyx-limb.

Nile Land. Abyssinia, on a mountain slope (7000–8000 feet) *Schimper!*

14. **C. zanzibaricum,** *Klotzsch in Peters Mossamb.* p. 291. A much branched, sometimes scandent, unarmed shrub. Branches subterete or obtusely 4-sided, glabrous, greenish, at length whitish, patent. Leaves ovate or oval, obtusely acuminate or attenuate-acute, rather unequal and obtuse, usually rounded or somewhat hollowed at the base, coriaceous, glabrous or nearly so, rather paler beneath, $1\frac{1}{2}$–$4\frac{1}{2}$ by 1–$2\frac{1}{4}$ in.; lateral veins about 6–8 pairs, sometimes rather hairy in the axils; petiole $\frac{1}{5}$–$\frac{1}{2}$ in., glabrous; stipules lanceolate-subulate from a broad base, glabrate, $\frac{1}{6}$–$\frac{1}{4}$ in., caducous or subpersistent. Flowers $\frac{1}{5}$–$\frac{1}{4}$ in. long, 5–4-merous, white, on hispidulous pedicels of $\frac{1}{12}$–$\frac{1}{3}$ in., many together in dense dichotomous panicles of 1–2 in. diameter.; common peduncle $\frac{1}{5}$–$\frac{2}{3}$ in., hispidulous or glabrate; bracteoles ovate or lanceolate, acute, small, ciliolate. Calyx-tube hispidulous or nearly glabrous, campanulate-turbinate; limb dentate; teeth small, ciliolate. Corolla-throat pubescent; lobes subobtuse. Disk somewhat hairy.

Stigma calyptriform, much exserted; style pubescent (except the variety). Fruit didymous or dimidiate, $\frac{3}{8}$–$\frac{1}{2}$ in. long; albumen ruminated; embryo nearly straight.—*Plectronia zanzibarica*, Vatke in Oesterr. Bot. Zeitschrift, xxv. p. 231 (1875).

Nile Land. Bongo-land, *Schweinfurth!*

Mozamb. Distr. Zanzibar Island, *Peters! Hildebrandt!* Nazimoio, *Kirk!*

Var. *glabristyle.* Style glabrous.

Mozamb. Distr. Zanzibar and Mombas, *Bojer! Kirk!* East Africa, *Forbes!* right bank of Luabo, *Kirk!* Lake Nyassa, entrance of Roangiva, *Kirk!*

15. **C. gracile,** *Hiern.* Glabrous except the inflorescence, unarmed. Branchlets slender, erect-patent, terete or at the extremities somewhat compressed, alternate. Leaves oval, subacuminate, mucronulate, more or less wedge-shaped at the base, chartaceous or thinly coriaceous, rather paler beneath, $1\frac{1}{2}$–4 by $\frac{3}{4}$–2 in.; lateral veins about 4–6 pairs; petiole $\frac{1}{5}$–$\frac{2}{5}$ in.; stipules lanceolate-subulate, erect, $\frac{1}{3}$–$\frac{1}{4}$ in. long. Flowers $\frac{1}{5}$–$\frac{1}{4}$ in. long on short sparsely pubescent pedicels, many together, in short rather dense repeatedly dichotomous shortly pedunculate opposite or alternate panicles of 1–2 in. diameter. Calyx-tube turbinate, sparsely pubescent; limb small, 5-dentate; teeth erect, hairy. Corolla glabrous outside; throat bearded; lobes 5, ovate, glabrous. Anthers elliptical, pointed at both ends, rather longer than the filaments. Disk puberulous. Style far exserted, glabrous; stigma calyptriform, much exserted.

Lower Guinea. Angola, at Ambriz, *Monteiro!*

16. **C. Heudelotii,** *Hiern.* Branches subterete, rather slender, puberulous and somewhat compressed towards the extremities. Leaves oval-ovate, more or less acuminate, obtuse or somewhat wedge-shaped at the base, thinly coriaceous, nearly glabrous, scarcely or slightly paler beneath, 3–4 by $1\frac{1}{4}$–2 in.; lateral veins about 7–9 pairs, slender, not conspicuous; margins narrowly sub-revolute; petiole $\frac{1}{3}$–$\frac{2}{5}$ in. puberulous; stipules much apiculate from a deltoid base, interpetiolar, puberulous, $\frac{1}{5}$ in. long. Common peduncles (in fruit) $\frac{1}{2}$ in. long, puberulous, patent; fruiting pedicels $\frac{1}{5}$–$\frac{2}{5}$ in. long, rather numerous; bracteoles minute. Fruit obliquely subglobose or didymous, glabrate, $\frac{1}{4}$ in. long; calyx-limb very small, glabrate, apparently pentamerous, subpersistent near the base of the fruit or in the case of the didymous fruits at the apex. Disk puberulous or glabrate. Albumen of the seeds ruminated.—*Canthium*, sp. nova, Benth. in Hook. Niger Fl. p. 410.

Upper Guinea. Senegambia, *Heudelot!*

17. **C. polycarpum,** *Schweinf. Mss. in Herb.* A tree 40 feet high, with very slender stem and elongated distichous glabrous angular unarmed erect-patent robust branches, forming a crown not unlike that of a tree-fern. Leaves oval, acuminate, obtusely narrowed near the base, chartaceous, glabrous or with short scattered curved hairs on the midrib and the 7–8 pairs of lateral veins beneath, $3\frac{1}{2}$–$4\frac{1}{2}$ by $1\frac{3}{4}$–2 in.; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., glabrous or nearly so; stipules ovate,

subacuminate, $\frac{1}{6}$ in. long, glabrous. Flowers . . . Fruits numerous, $\frac{1}{5}$–$\frac{1}{4}$ in. long, didymous or dimidiate, glabrous, rather wrinkled. Seeds horse-shoe-shaped; albumen uniform; embryo similar, terete. Epigynous disk obsoletely hispid; calyx 5?-lobed. Pedicels puberulous, $\frac{1}{10}$–$\frac{1}{5}$ in. long. Panicles repeatedly dichotomous, subglobose, 2–3 in. long; common peduncles very short, opposite.

Nile Land. Niamniam-land, Nabambisso, *Schweinfurth!*

18. **C. glabriflorum,** *Hiern.* An unarmed tree, 40–50 feet high, with palm-like habit; branches erect-patent, obtusely angular, glabrous or somewhat hispid. Leaves oval, shortly and abruptly acuminate, with a broad somewhat excavated base, thinly coriaceous, scabrous-hispid or glabrate above, turning reddish when dry, more or less hispid on the veins beneath, 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; lateral veins about 7–8 pairs; petiole $\frac{1}{5}$–$\frac{2}{5}$ in., hispid or glabrate; stipules ovate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers $\frac{1}{6}$ in. long (exclusive of the style), on short puberulous or glabrate pedicels, many together, in dense dichotomous globose panicles of 1–$1\frac{1}{2}$ in. diameter; common peduncle glabrate or puberulous, short or ranging up to $\frac{1}{2}$ in., spreading, sometimes unilateral. Calyx-tube glabrous; limb truncate or obscurely toothed, glabrous or ciliolate. Corolla glabrous outside, bearded inside; lobes 5, subobtuse. Disk glabrous. Stigma elongate-calyptriform, much exserted.

Upper Guinea. St. Thomas Island, alt. 1000 feet, *Mann!* Old Calabar, *Rev. W. C. Thomson!*

19. **C. Cornelia,** *Cham. et Schl. in Linnæa,* iv. p. 15 (1829). A twining tawny-pubescent unarmed shrub. Branches spreading. Leaves oval, obtusely or subacutely pointed at apex, rounded or emarginate at the base, thinly coriaceous, $1\frac{1}{2}$–3 by $\frac{3}{4}$–$1\frac{3}{4}$ in.; lateral veins about 6–8 pairs; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., rather thick; stipules depresso-deltoid, apiculate, $\frac{1}{5}$ in. long. Flowers about $\frac{1}{6}$ in. long, on rather short pubescent pedicels more or less densely packed in subglobose or hemispherical panicles of about 1–2 in. diameter, on a stout common peduncle of $\frac{1}{4}$–$\frac{3}{8}$ in. Calyx-tube loosely pubescent, small; limb wider, deeply 5-lobed; teeth lanceolate, pilose-ciliate. Corolla glabrous outside; throat bearded; lobes 5, subobtuse. Anthers apiculate, longer than the filaments. Disk glabrous. Stigma far exserted, calyptriform; style glabrous. "Fruit 1-celled by abortion, subreniform" (A. Rich.).—DC. Prod. iv. p. 473 (1830). *Pavetta Cornelia,* Reichenb. in Hb. Sieber. Seneg. n. 21! et ex DC. l. c. *C. senegalense,* A. Rich. ex DC. l. c. p. 476, et in Mém. Soc. Hist. Nat. v. p. 188 (1834). *Plectronia hirsuta,* DC. l. c. p. 476.

Upper Guinea. Senegambia, *Sieber!* and others.

20. **C. hispidum,** *Benth. in Hook. Niger Fl.* p. 409. A pilose-hispid unarmed shrub with usually spreading branches and scandent or rambling habit. Leaves cordiform ovate or oval, more or less acuminate, acute or apiculate, cordate rounded or emarginate at the base, chartaceous, paler beneath, $\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{1}{2}$–$2\frac{1}{2}$ in.; lateral veins about

7–12 pairs; petiole $\frac{1}{12}$–$\frac{1}{3}$ in. long; stipules small. Flowers $\frac{1}{4}$ in. long, on very short pubescent pedicels, many together, in dense small pedunculate panicles; common peduncles ranging up to $\frac{1}{2}$ in., hispid. Calyx-tube turbinate, pilose-pubescent; limb 5-dentate; teeth small, erect, somewhat hairy. Corolla glabrous outside; tube inside covered with deflexed paleaceous setæ. Disk hispidulous. Style exserted, glabrous; stigma calyptriform, 5-sulcate. Fruit $\frac{1}{5}$ in. long (perhaps immature).

Upper Guinea. Sierra Leone, *G. Don, Afzelius!* Niger, Lagos, *Barter!* Cape Coast, *Brass!*

Lower Guinea. Loango, *Soyaux!*

21. **C. setosum,** *Hiern.* A climbing unarmed shrub of 40–50 feet. Branchlets thickened at the nodes, glabrate, subterete. Leaves oblong, narrowly acuminate, with a broad rounded or rather hollowed base, thinly coriaceous, pilose-hispid on the midrib margins and beneath on the veins, turning reddish when dry, 5–7 by 2–3 in.; lateral veins about 10 pairs; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., pilose-hispid; stipules deltoid-acuminate, $\frac{1}{3}$ in. long. Flowers $\frac{1}{4}$ in. long, on nearly as long slender hispid pedicels, numerous, in dense globose subsessile bracteate panicles of $1\frac{1}{2}$–2 in. diameter. Calyx-tube pilose; limb glabrous or nearly so, 5-toothed. Corolla-tube glabrous outside; throat hairy; lobes 5. Disk hairy. Stigma elongate-calyptriform, much exserted.

Upper Guinea. Cameroon Mountains, alt. 2500 feet, *Mann!*

22. **C. subcordatum,** *DC. Prod.* iv. p. 473. Branches unarmed, terete, spreading, hispid-pubescent with short spreading hairs towards the extremities, glabrescent below. Leaves oval, obtuse or subacute, nearly rounded or subcordate at base, thinly coriaceous, glabrate above, hispidulous on the midrib and on the 7–8 pairs of lateral veins beneath, $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–2 in.; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., hispidulous; stipules lanceolate-subulate from a broad base, $\frac{1}{4}$ in. long, hispidulous outside, caducous. Flowers very small; peduncles bifid, cymose, many-flowered; stigma ovate (DC.). Fruit didymous or subdimidiate, $\frac{1}{3}$–$\frac{1}{2}$ in. long, on hispidulous pedicels of $\frac{1}{4}$ in., in dichotomous cymes of $1\frac{1}{2}$–$1\frac{3}{4}$ in.; common peduncle $\frac{3}{4}$ in., puberulous or glabrate. Albumen ruminated.

Upper Guinea. Senegambia, in moist woods near Albreda, Gambia, *Leprieur and Perrottet, Heudelot!*

23. **C. congense,** *Hiern.* Unarmed, glabrous except the inflorescence. Branches subterete, rather pale, patent. Leaves oval, shortly and obtusely acuminate, rounded or nearly so or somewhat hollowed at the base, coriaceous, paler beneath, 2–$4\frac{1}{2}$ by $1\frac{1}{8}$–$2\frac{1}{3}$ in., rarely smaller; lateral veins about 4–5 pairs; petiole $\frac{1}{8}$–$\frac{3}{8}$ in.; stipules lanceolate-subulate from a broad base, $\frac{1}{4}$–$\frac{3}{8}$ in. Flowers small, numerous, on short hispidulous pedicels ranging up to $\frac{1}{6}$ in., arranged in dense globose dichotomous panicels of $\frac{1}{2}$–1 in. diameter; common peduncle hispidulous or glabrate, ranging up to $\frac{1}{3}$ in. Calyx-tube turbinate-hispid with short golden-coloured hairs; teeth 5, small,

hispid. Corolla-tube glabrous outside (glabrous also inside when young); lobes 5, subobtuse. Disk hispidulous. Style glabrous, far exserted; stigma calyptriform.

Lower Guinea. Congo, *Chr. Smith!*

24. **C. rubens,** *Hiern.* A nearly glabrous unarmed climbing shrub. Branches obtusely angular, erect, patent. Leaves oval, shortly and acutely acuminate, with a broad rather hollowed base, or those at the base of the branchlets subreniform, coriaceous, glabrous except the appressedly puberulous midrib and 7–8 pairs of lateral veins and their axils, turning reddish in the dry state, $2\frac{1}{2}$–5 by $2\frac{1}{2}$–3 in.; petioles $\frac{3}{8}$–$\frac{5}{8}$ in., puberulous or glabrescent; stipules ovate, acute, $\frac{1}{3}$ in. long, glabrous outside, hairy inside. Flowers $\frac{1}{4}$ in. long, on rather shorter pubescent pedicels, in dichotomous corymbose bracteate panicles of 1–$1\frac{1}{2}$ in. diameter; common peduncle shortly pubescent, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Calyx glabrous or nearly so, except the 5 teeth which are covered with short golden-coloured hairs. Corolla glabrous outside; throat bearded; lobes 5, glabrous, subacute, ovate. Disk hairy. Stigma calyptriform, exserted.

Upper Guinea. Bagroo River, *Mann!*

25. **C. fœtidum,** *Hiern.* A glabrous unarmed shrub, much resembling *C. zanzibaricum*, Kl. Branches terete, rather compressed towards the extremities. Leaves oval, scarcely acuminate, apiculate, coriaceous, turning rather red when dry, rather paler beneath, rounded or nearly so at the base, 4–6 by $1\frac{1}{4}$–$2\frac{1}{4}$ in.; lateral veins about 7–8 pairs, not prominent; petiole $\frac{3}{8}$–$\frac{1}{2}$ in.; stipules lanceolate-subulate from a broad ovate base, $\frac{1}{3}$–$\frac{3}{8}$ in. long, deciduous. Flowers $\frac{1}{4}$ in. long, 5-merous, on glabrous pedicels of about $\frac{1}{5}$ in., many together, in dense dichotomous panicles of about 1 in. diameter; common peduncle glabrous, $\frac{1}{3}$–$\frac{2}{5}$ in. long, with a small ovate glabrous bracteole at apex. Calyx glabrous, campanulate-turbinate; limb 5-toothed; teeth small, acute. Corolla-tube hairy inside; throat not densely bearded. Disk shortly hairy. Style much exserted, glabrous at least above; stigma mitriform.

South Central? Muata Manja, 'flowers with most abominable smell,' *Kirk!*

26. **C. Afzelianum,** *Hiern.* A much branched glossy shrub of moderate size. Branches opposite, spreading, angular, somewhat dilated at the nodes, glabrous. Leaves oval, obtusely acuminate, usually wedge-shaped at the base, glabrous, thinly coriaceous, of nearly the same colour on both surfaces, not turning red, 3–5 by $1\frac{1}{4}$–$2\frac{1}{2}$ in.; lateral veins about 6–7 pairs, slender; tertiary veins not conspicuous; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules deltoid, subapiculate, $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers tetramerous, $\frac{1}{8}$–$\frac{1}{6}$ in. long, about equalling the arching puberulous pedicels, many together, in dense dichotomous pedunculate axillary panicles of 1–2 in. diameter; common peduncle ranging up to $\frac{3}{5}$ in., puberulous. Calyx puberulous; limb subtruncate or obscurely 4-toothed. Corolla yellowish white, glabrous outside, pubescent inside

the throat; tube funnel-shaped; lobes 4, ovate, obtuse, reflexed. Anthers white. Disk hispidulous. Style glabrous, subflexuous, greenish; stigma far exserted, calyptriform, terete. Fruit subdidymous or oblique.—*Pavetta parviflora*, Afzel. Remed. Guin. (vii.) 47 (3 May, 1815). *? P ? Smeathmanni*, DC. Prodr. iv. p. 492.

Upper Guinea. Sierra Leone, *Afzelius! Smeathman!*

The bruised bark is employed by the natives in the case of swollen legs and knees.

The following specimens apparently belong to this species.

Cape Coast, *Th. Vogel!* in young fruit (*Canthium horizontale*, Benth., quoad specimen T. Vogel., in Hook. Niger Fl. p. 408, non *Phallaria horizontalis*, Schum.); Niger Expedition, *Barter!* A small tree, in very young bud.

27. **C. Barteri,** *Hiern.* A hispid-pubescent unarmed shrub, turning reddish in the dry state. Branches subterete, rather spreading. Leaves elliptical, narrowed at both ends, acute, firmly chartaceous, glabrescent above except the midrib, hispid-pubescent beneath at least on the principal veins, 2–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., or those at the base of the branchlets ovate and smaller; lateral veins about 5–6 pairs; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., hairy; stipules lanceolate-subulate from a broad base, hairy, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers $\frac{1}{8}$ in. long, on hispidulous pedicels of $\frac{1}{6}$–$\frac{1}{5}$ in., many together in dichotomous cymes of 1–$1\frac{1}{2}$ in. diameter; common peduncle ranging up to $\frac{1}{2}$ in. Calyx-tube hispidulous; limb nearly glabrous, 4-toothed; teeth ciliolate. Corolla-tube hairy inside; lobes 4. Style glabrous, far exserted. Disk hairy.

Upper Guinea. Niger Expedition, at Assasha, *Barter!*

28. **C. nervosum,** *Hiern.* A shrub, glabrescent except the inflorescence, unarmed. Branches black-ashy, terete. Leaves oval, acuminate, obtuse, oblique and rounded or somewhat narrowed at the base, coriaceous, turning reddish when dry, glossy, glabrous except small hairy depressions in the axils of the primary and secondary veins, 3–5 by $1\frac{1}{4}$–$2\frac{1}{4}$ in.; lateral veins about 8–11 pairs; petiole $\frac{1}{4}$ in.; stipules subulate from a broad base, $\frac{1}{3}$ in. long. Flowers $\frac{1}{6}$ in. long (exclusive of the style), on rather shorter pubescent pedicels, many together in dichotomous panicles of $\frac{1}{2}$–1 in. diameter; common peduncle nearly glabrous, $\frac{1}{5}$–$\frac{2}{5}$ in., bibracteate at apex. Calyx-tube pubescent with short golden-coloured hairs; limb subglabrous, 4-cleft; teeth ciliolate, ovate, obtuse. Corolla glabrous except the puberulous throat; lobes 4, ovate, subobtuse. Disk hairy. Stigma calyptriform, 8-costate, exserted; style glabrous, longer than the corolla.

Upper Guinea. Bagroo River, *Mann!*

29. **C. Mannii,** *Hiern.* An unarmed shrub, quickly glabrescent except parts of the inflorescence, etc., 15–20 feet high. Branches patent. Leaves oval, subacuminate, subapiculate, obtuse, scarcely rounded at the base, coriaceous, glabrate except the slightly hairy depressions in the axils of the 8–9 pairs of lateral veins beneath, rather paler beneath, 2–4 by $\frac{7}{8}$–$1\frac{3}{4}$ in.; petiole $\frac{1}{6}$–$\frac{1}{3}$ in.; stipules deltoid-acuminate, $\frac{1}{6}$ in. long. Flowers $\frac{1}{6}$ in. long, nearly glabrous, on short golden-pubescent pedicels, many together, in dense panicles $\frac{2}{3}$–1 in.

diameter; common peduncle glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. Calyx-tube glabrous or nearly so; limb 4-toothed; teeth subciliate. Corolla white, glabrous outside; throat bearded; lobes 4, scarcely acute, glabrous. Disk hispidulous. Style glabrous. Stigma far exserted, calyptriform, 8-costate. Fruit $\frac{3}{8}$ in. long, subdidymous or oblique, smooth; seeds somewhat curved. Albumen ruminated.

Upper Guinea. Cameroon River, *Mann!*

30. **C. lividum,** *Hiern.* A nearly glabrous unarmed shrub. Branches erect-patent, terete, compressed towards the extremities. Young leaves (at the time of flowering) oval-oblong, subacute or subacuminate, obtuse or somewhat unequally narrowed at base, chartaceous, bluish-black on both sides when dry, $1\frac{1}{2}$–3 by $\frac{1}{2}$–$1\frac{1}{4}$ in.; lateral veins about 6 pairs, inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules ovate, apiculate, $\frac{1}{8}$ in. Flowers tetramerous, $\frac{1}{8}$ in. long, glabrous outside, on puberulous pedicels of $\frac{1}{8}$–$\frac{1}{4}$ in., many together, in dense dichotomous panicles of 1–$1\frac{1}{4}$ in. diameter, appearing when the leaves are young; common peduncles $\frac{1}{4}$–$\frac{1}{2}$ in. long, glabrate or puberulous; bracteoles wanting or minute. Calyx-teeth small, glabrous. Corolla-tube hairy inside. Disk glabrous. Style far exserted, glabrous; stigma calyptriform.

Mozamb. Distr. Moramballa, alt. 1800 feet, *Kirk!*

31. **C. venosum,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. 85, t. 49, *sub* Plectroniâ. A shrub of about 15 feet, or a tree, or climbing to a considerable height, unarmed. Young parts peduncles and pedicels ferruginous-hispid. Branches subterete, ashy, glabrescent, spreading. Leaves oval oval-ovate or elliptic-lanceolate, obtuse or acuminate, rounded or wedge-shaped at the base, thinly coriaceous, nearly glabrous, with rather hairy depressions in the axils of the 4–6 pairs of lateral veins, 3–5 by 1–2 in., sometimes smaller; tertiary veins transverse; petiole $\frac{1}{5}$–$\frac{1}{3}$ in., glabrescent; stipules ovate-acuminate from a broad base, $\frac{1}{4}$ in. long, caducous. Flowers about $\frac{1}{6}$ in. long, white, on shorter or equalling pedicels, many together in globose dichotomously branched panicles of about 1 in. diameter; peduncle about $\frac{1}{4}$ in. long. Calyx-tube turbinate, glabrous or nearly so; limb small, glabrous except the 4 small ciliolate teeth. Corolla glabrous outside; throat pubescent; lobes 4, obtuse. Disk hairy. Style exserted, glabrous; stigma calyptriform. Fruit $\frac{1}{4}$–$\frac{1}{3}$ in. long, hard, globose or subdidymous. Seeds subglobose; albumen ruminated.—*Canthium*, sp., T. Thoms. in Speke, Journ., App. p. 636.

Nile Land. Madi, in woods, a tree, *Speke and Grant!* Djur-land, a high climbing shrub, *Schweinfurth!* Bongo-land, a shrub of 15 feet, *Schweinfurth!*

Var.? *pubescens.* Branches more hairy. Leaves ferruginous-pubescent on the veins beneath, ranging up to 6 by 3 in.

Upper Guinea. Niger, Brass, *Barter!* Onitsha, *Barter!*

32. **C.? multiflorum,** *Hiern.* A decumbent or scandent shrub; branches numerous, brachiate, obtusely tetragonal, quite glabrous. Leaves distichous, oblong-ovate, attenuate at the apex, subacute,

shortly petiolate, quite glabrous, delicately net-veined, 2 in. long; stipules attenuate and compressed at the apex. Peduncle axillary, the length of the petiole, twice or thrice bifid; pedicels numerous clustered; bracts opposite at the division of the peduncle, roundish, acute, sessile. Calyx-limb 5-toothed. Corolla tubular-campanulate, whitish; tube pubescent inside, $\frac{1}{12}$ in. long; limb 5-cleft; lobes ovate, acute, reflexed, half the length of the tube. Filaments 5, inserted at the mouth of the corolla-tube; anthers ovate-oblong, dark brown. Ovary turbinate-subrotund, quite glabrous; style filiform, a little longer than the tube; stigma capitate, ovoid, obsoletely bifid at the apex.—*Psychotria multiflora*, Thonning in Schum. Beskr. Guin. Pl. p. 109.

Upper Guinea. Guinea, about Asiama, flowering in May, *Thonning*.
The description is taken from Thonning l. c.; I have seen no specimen.

33. **C. bibracteatum,** *Baker, Fl. Maurit.* p. 146, *sub* Plectroniâ. A glabrous unarmed shrub. Branches ashy, striate, erect-patent, subterete or the extremities subcompressed. Leaves oval, obtuse, nearly rounded at the apex, somewhat narrowed at base, dark and rather glossy above in the dry state, rather paler beneath, glabrous except depressions in the axils of the 3–5 pairs of lateral veins beneath, coriaceous, 2–4$\frac{1}{2}$ by 1–2$\frac{1}{2}$ in.; petiole $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules ovate, apiculate, glabrous, $\frac{1}{4}$ in. Flowers $\frac{1}{8}$ in. long, tetramerous, on short glabrous pedicels, several together, umbellately arranged on a very short glabrous common peduncle bibracteate at the apex; bracteoles ovate-lanceolate, rather exceeding the pedicels. Calyx glabrous; teeth obtuse. Corolla-throat densely bearded; tube without deflexed hairs inside; lobes obtuse. Disk glabrous. Stigma capitate, globose, not much exserted. Fruit $\frac{1}{5}$ in. long.—*Psathura macrophylla* and *Pyrostria comorensis*, Boj. mss. ex Baker l. c.

Mozamb. Distr. Zanzibar, *Kirk!*
Occurs also in the Seychelles, the Comoro Islands, and Madagascar. This and the next species have much the habit of the Mascarene genus *Pyrostria*.

34. **C. crassum,** *Schweinf. mss. in Herb. sub* Vangueriâ. A nearly glabrous unarmed shrub, 5–15 feet high. Branches glabrous, thick, the younger ones hollow. Bark corky, whitish. Leaves opposite, glabrescent, obovate or oval, rounded obtuse or subacute at the apex, wedge-shaped at the base, net-veined, subcoriaceous, 6–9 by 3–4$\frac{1}{2}$ in.; the young one smaller, turning black in the dry state; lateral veins about 8–10 pairs; petiole $\frac{1}{2}$–$\frac{2}{3}$ in.; stipules apiculate from a coriaceous broad ovate or truncate connate base, $\frac{1}{4}$–$\frac{3}{8}$ in. long, subpersistent. Flowers 4–5-merous, $\frac{1}{4}$ in. long in bud, on very short pedicels, numerous, in pedunculate lateral and axillary puberulous dense panicles of $\frac{1}{2}$–1 in. diameter, below the young leaves; peduncle $\frac{1}{2}$–1 in. long, puberulous or glabrate; bracteoles ovate, small, alternate. Calyx $\frac{1}{8}$ in. long; tube puberulous; limb broader, glabrate, obsoletely toothed. Corolla glabrate outside; tube furnished with deflexed hairs inside; throat pubescent; lobes ovate, obtuse. Anthers glabrous. Ovary 2-celled; stigma capitate, globose, shortly exserted; style glabrous.

Galla Land. Mittu-land, *Schweinfurth!* Djur-land, *Schweinfurth!*

35. **C. vanguerioides,** *Hiern.* An unarmed shrub, 8 feet high. Branches terete, puberulous or at length glabrate, ashy; the young shoots ferruginous-pubescent, erect-patent. Leaves oval, acuminate, apiculate, rounded at the base or nearly so, chartaceous, strigose-pubescent and dark above, more densely so and pale beneath, deciduous, $2\frac{1}{2}$–$6\frac{1}{2}$ by 1–3 in.; lateral veins about 6–12 pairs; petiole $\frac{1}{6}$–$\frac{2}{5}$ in., pubescent; stipules apiculate-subulate from a broad connate sheathing subtruncate base, $\frac{1}{3}$–$\frac{3}{8}$ in. long. Flowers $\frac{3}{8}$ in. long before expansion (exclusive of the tails of the corolla), $\frac{1}{4}$ in. long when expanded, green and yellow, on pedicels ranging up to $\frac{1}{5}$ in., numerous, in cymose pubescent axillary and lateral bracteolate panicles of $1\frac{1}{2}$–3 in. diameter; common peduncle $\frac{1}{8}$–$\frac{1}{4}$ in., with 2 connate ovate bracteoles at the apex. Calyx turbinate; limb deeply cleft, hairy on both sides near the base; lobes 5, oval, obtuse, spreading or reflexed, tomentose outside, $\frac{1}{8}$–$\frac{1}{6}$ in. long, glabrescent inside. Corolla pale-tomentose outside, deeply 4–6 cleft; tube with reflexed hairs inside; throat not bearded; lobes lanceolate, caudate-acuminate, glabrous inside, spreading and recurved. Anthers exserted, glabrous. Disk glabrous. Style glabrous; stigma shortly exserted, calyptriform.

Upper Guinea. Sierra Leone, *Barter!* Niger, *Barter! Baikie!* Abbeokuta, *Irving!*

36. **C. lanciflorum,** *Hiern.* Unarmed, closely branched. Branches terete, reddish; bark rather mealy. Leaves oval, scarcely acuminate, rounded or emarginate at the base, coriaceous, dark green and sparingly hispid above, tawny-tomentose beneath, 4–5 by 2–$2\frac{1}{4}$ in.; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers $\frac{3}{4}$ in. long before expansion, scarcely $\frac{1}{2}$ in. high when expanded, pentamerous, tomentose outside, many together, in very dense shortly pedunculate lateral panicles. Calyx-lobes ovate-lanceolate, acute, glabrous inside, $\frac{1}{10}$ in. long. Corolla deeply lobed, subrotate; tube short, inside with dense deflexed ferruginous hairs; lobes narrowly lanceolate, long, glabrous inside. Anthers somewhat hairy, exserted, equalling the glabrous filaments. Disk glabrous. Ovary 2-celled. Style exserted, glabrous; stigma conical-calyptriform.

South Central. Near Victoria Falls, *Kirk!* (said to be one of the best fruits of the country).

50. VANGUERIA, Commers.; Benth. et Hook. f. Gen. Pl. ii. p. 111.

Calyx-tube short, globose campanulate or turbinate; limb erect or spreading, truncate or 5- rarely 4-lobed, lobes short, deciduous or rarely persistent. Corolla-tube short, hairy or glabrous outside, usually furnished inside with a ring of deflexed pilose hairs; throat bearded; lobes spreading or reflexed, usually acute or acuminate, valvate in æstivation. Stamens 5, rarely 4, inserted on the throat or mouth of the corolla, more or less exserted; filaments short or equalling the oval ovate or lanceolate anthers, fixed to the back of the anthers near their base. Disk fleshy or depressed. Ovary 5–3-celled; style

glabrous, equalling the corolla or exserted; stigma capitate, sometimes sulcate or subcalyptriform, often shortly 5–3-lobed at the tip, glabrous; ovules solitary, anatropous, pendulous from above the middle of the ovary. Fruit drupaceous; pyrenes 5–3 or putamen 5–3-celled. Seeds oblong; umbilicus ventral; testa membranous; albumen fleshy; embryo straight, radicle superior, terete.—Shrubs or trees, sometimes spinous or subscandent, with opposite or alternate branches, opposite (rarely pseudo-verticillate in fours) oval leaves, apiculate stipules usually connate at the base, and small white or greenish flowers arranged in axillary or lateral clusters or short panicles.

A genus of moderate size, confined to the warmer parts of Asia and Africa.

Unarmed or with spines of $\frac{1}{12}$–$\frac{1}{3}$ in.; erect. Leaves opposite. Flowers 5–8-merous.
- Corolla-lobes subapiculate or mucronulate or subacute, not caudate.
  - Calyx-lobes ovate or oval.
    - Fruits terete or roundedly 4–5-sided.
      - Tawny-tomentose. Leaves usually rounded or obtuse at the base . . . . . 1. *V. infausta.*
      - Glabrous. Leaves usually narrowed at both ends . . 2. *V. edulis.*
    - Fruits ribbed and sulcate . . . . . 3. *V. abyssinica.*
  - Calyx truncate or with small subulate teeth.
    - Leaves about 1–1½ in. long. Branches intricate . . . 4. *V. senegalensis.*
    - Leaves usually exceeding 1½ in. Branches not intricate.
      - Leaves paler beneath (in the dry state).
        - Calyx 5-toothed, more or less hairy . . . . . 5. *V. canthioides.*
        - Calyx truncate, glabrous.
          - Flowers 2–3 together . . . . . 6. *V. euonymoides.*
          - Flowers 5–7 together . . . . . 7. *V. umbellulata.*
      - Leaves light green on both sides (in the dry state).
        - Pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long. Ovary 5-celled . . . . . 8. *V. concolor.*
        - Pedicels $\frac{1}{3}$–$\frac{2}{5}$ in. long. Ovary 3–4-celled . . . . 9. *V. membranacea.*
  - Corolla-lobes caudate-acuminate.
    - Corolla tomentose outside; lobes 5. Ovary 5-celled. Unarmed . . . . . 10. *V. velutina.*
    - Corolla glabrous outside; lobes 6 or 8. Ovary 3–4-celled.
      - Spinous . . . . . 11. *V. pauciflora.*

Spines ½–1 in. Subscandent. Leaves crowded, pseudo-verticillate in fours. Flowers 4–5-merous . . . . . 12. *V. tetraphylla.*

1. **V. infausta,** *Burch. Trav. S. Afr.* ii. p. 258 *c. not.*, p. 259 *fig.*, p. 451, p. 499 (1824). A tawny-tomentose unarmed shrub, 4–10 feet high, or a small tree, inodorous, with several erect stems. Branches terete or the extremities subcompressed; bark whitish. Leaves opposite, ovate oval or suborbicular, horizontal, softly and shortly tomentose, usually rounded or obtuse at the base and somewhat narrowed at apex, greenish above, rather paler beneath, inconspicuously net-veined, chartaceous, deciduous, 1½–9 by 1–5 in.; lateral veins about 7–10 pairs; stipules caudate-acuminate from a broad ovate base, greenish, $\frac{3}{8}$–$\frac{3}{4}$ in. long, covering a ring of setose hairs, deciduous; petiole $\frac{1}{8}$–$\frac{3}{4}$ in., tomentose. Flowers greenish, pentamerous, ¼ in. long, shortly pedicellate; panicles 2–3-chotomous, often with a flower in the forks, more or less hairy, 1–2 in. diameter, mostly lateral in axils of fading or fallen leaves, below the young leaves; common peduncle short, bracteate; bracteoles short. Calyx-lobes ovate or oval, spreading, persis-

tent, hairy on both sides, short. Corolla subcampanulate, more or less hairy outside; throat hairy; lobes revolute, ovate, mucronulate, glabrous inside, nearly equalling the tube. Anthers yellow or brown, exserted. Disk glabrous. Ovary 5-celled; style robust, just exceeding the corolla, glabrous; stigma drum-shaped, sulcate. Fruit globose, smooth, glabrous, $\frac{1}{2}$–1 in. diameter, 5-seeded.—DC. Prod. iv. p. 454. *V. velutina*, Hook. Bot. Mag. t. 3014. *V. tomentosa*, Hochst. in Flora, 1842, p. 238 in not.

Mozamb. Distr. Tette, *Kirk!* between Lupata and Tette, fruit edible, *Kirk!* Rovuma River, 8 miles from the coast, *Kirk!*

Occurs also in the Kalahari region of South Africa to Delagoa Bay, Natal, and Kafirland; also in Madagascar (Hooker) and introduced in Seychelles.

Burchell states that this plant was regarded by the Bachapins as bewitched and unlucky, and therefore unfit for firewood, and that the fruit is not edible. It is, however, edible in other parts of S. Africa, and is the Wild Medlar of the colonists; in Kafirland it is an excellent fruit tree, and the fruit surpasses our medlar. There is in the Kew Herbarium a specimen collected by Baines in the year 1872 from 'tropical South Africa.'

2. **V. edulis,** *Vahl, Symb.* iii. p. 36 (1794). A good-sized shrub, 8 feet high or more, or a small tree, glabrous except under the stipules and the inflorescence. Branches subterete, of a dull reddish colour. Leaves opposite, deciduous, elliptical, usually acute at both ends, membranous, or at length chartaceous, rather paler beneath, delicately net-veined, 2–8 by 1–4 in.; lateral veins about 5–10 pairs, slender, not prominent; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules caudate-acuminate from a deltoid persistent base, about $\frac{1}{2}$ in. long. Flowers greenish, appearing when the leaves are young, $\frac{1}{6}$–$\frac{1}{4}$ in. long, on short alternate pedicels, in divaricately branched rather lax lateral and axillary puberulous panicles of 1–2 in. diameter; common peduncles glabrate or puberulous, ranging up to $\frac{1}{2}$ in., bearing two opposite bracteoles connate at the base, inserted at or near the top. Calyx glabrous; limb spreading; teeth 5, ovate, subacuminate. Corolla glabrous outside, funnel-shaped; lobes 5, ovate, subacute. Ovary 5-celled. Stigma calyptriform, shortly exserted; style glabrous. Fruit edible, subglobose, somewhat 4–5-sided, about 1 in. diameter, 4–5-seeded.—DC. Prodr. iv. p. 454, cum syn. *V. venosa*, Hochst. in Hb. Schimp. Abyss. ii. 653; non Sonder.

Upper Guinea. Niger, Idda, and Aboh, *Barter!*

Nile Land. Abyssinia, *Q. Dillon and Petit! Schimper!* ii. 653; *Ferret and Galinier* (habit of the coffee-plant), *Hildebrandt!* Gallabat, *Schweinfurth!* Djurland, *Schweinfurth!* Bongo-land, *Schweinfurth!*

Occurs also in Madagascar and other African islands, and is found (probably introduced) in the East Indies.

Var. *Bainesii.* Leaves mostly rounded at base. Can this be *V. infausta*, var. *β. virescens*, Sond. in Harv. et Sond. Fl. Cap. iii. 14?

South Central? South African Gold Fields, Mangwe River, *Baines!*

A native also of Madagascar according to De Candolle, Prodr. iv. p. 454, and cultivated in the Mascarene Islands and China.

3. **V. abyssinica,** *A. Rich. Fl. Abyss.* i. p. 353. An unarmed shrub or small tree, tawny-tomentose on the young parts. Branches

subterete, subcompressed at the extremities. Leaves elliptical, narrowed at both ends, velvety especially when young, chartaceous, 2–5 by 1–2 in.; lateral veins about 10 pairs; petiole $\frac{1}{12}$–$\frac{1}{4}$ in.; stipules caudate-acuminate, from a broad connate base, sheathing, about $\frac{3}{8}$ in. long, deciduous. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, pentamerous, appearing below the young leaves, shortly pedicellate, in 2–3-chotomously divaricately branched panicles of about 1 in. diameter; common peduncle $\frac{1}{5}$–$\frac{1}{2}$ in. long, bibracteolate. Calyx-teeth fleshy, obtuse, spreading, velvety on both sides, short. Corolla funnel-shaped, half cleft, yellowish green, pubescent outside; throat bearded; lobes ovate, cuspidate, reflexed. Anthers exserted. Style rather flexuous, glabrous, equalling the corolla; stigma mitriform, whitish. Ovary 5-celled. Fruit subglobose, 4–5-sulcate, smooth, $\frac{3}{4}$–1 in. diameter, 4–5-seeded.—*V. Barnimiana*, Schweinf. Pl. Nilot. p. 30, t. xi.

Nile Land. Abyssinia, Taccazé Valley, near Tchélatchékanné, *Quartin Dillon;* near Ferrakoba, *Schimper!* 638 (*V. edulis?* Unio itin.), in fruit. Sennaar, Gebel—Fezoghlu and Abu--Sugra on the left bank of the river Bahr-el-azrâk, *Hartmann.*

I have seen types of neither Richard nor Schweinfurth's species; the description of the flowers is taken from Schweinfurth's description and figure.

4. **V. senegalensis,** *Benth. et Hook. f. Gen. Pl.* ii. p. 111. A nearly glabrous intricately branched shrub. Branchlets terete, sometimes furnished with short spines of $\frac{1}{8}$ in., scattered at the apex with sparse strigose pubescence or glabrate. Leaves opposite, ovate-lanceolate, obtusely acuminate, acute at the base, rather paler beneath, shortly petiolate, about 1–1$\frac{1}{2}$ in. long, puberulous beneath in the axils of the inconspicuous lateral veins or obsoletely so; stipules pubescent within, connate at the base, apiculate. Peduncles axillary, solitary, bearing one or few flowers, patent, about $\frac{1}{4}$ in. long, twice the length of the petiole. Flowers small, shortly pedicellate; pedicels with a bracteole in the middle or beneath the calyx. Calyx-limb very short, acutely 5-dentate. Corolla-lobes acute, rather crass. Disk depressed. Anthers 5, exserted, subsessile, cordate, puberulous. Ovary 3–4-celled; style exserted; stigma capitate, rugulose-sulcate, obsoletely (3–) 4-mamillate. —*Rytigynia* (Phallaria) *senegalensis*, Blume, Mus. Bot. i. p. 179.

Upper Guinea. Senegal, *Leprieur!* (seen in Hb. Mus. Brit., but without Blume's authentication.)

5. **V. canthioides,** *Benth. in Hook. Niger Fl.* p. 408. An unarmed shrub of 12 feet, or a small tree. Branches terete, slender, glabrescent; branchlets alternate, pubescent. Leaves oval or ovate, obtusely acuminate, rounded or somewhat narrowed at the base, chartaceous, with short scattered pubescence, paler beneath (when dry), 1–4 by $\frac{1}{2}$–1$\frac{3}{4}$ in.; lateral veins about 5–6 pairs; petiole $\frac{1}{20}$–$\frac{1}{5}$ in.; stipules subulate from a short sheathing connate pubescent base, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers (when expanded) $\frac{1}{4}$ in. long, pentamerous, greenish white; pedicels slender, short, rather lengthening in fruit, pubescent or glabrate, 3–1 together, on a short common bracteolate axillary peduncle. Calyx pubescent or nearly glabrous; teeth short, ciliolate,

subulate. Corolla-tube cylindrical, glabrous except the throat; lobes ovate, sub-apiculate. Anthers half exserted, puberulous. Ovary 5–3-celled; style rather exceeding the corolla; stigma globular, obscurely lobed. Fruit glabrate, globose, $\frac{1}{6}$–$\frac{1}{5}$ in. diameter.

Upper Guinea. Sierra Leone, *G. Don! Afzelius! Wilford!* Niger, Nupe, *Barter!* Bagroo River, *Mann!*

6. **V. euonymoides,** *Schweinf. mss. in Herb.* A nearly glabrous unarmed shrub, 10–20 feet high. Branches terete, glabrous, reddish or ashy brown; branchlets usually alternate. Leaves oval or somewhat ovate, obtusely acuminate, more or less obliquely narrowed at the base, chartaceous, glabrate above, paler with little hairy tufts in the (glandular) axils of the 4–6 pairs of lateral veins beneath, 1–3 by $\frac{3}{8}$–$1\frac{1}{3}$ in.; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., glabrate; stipules subulate-apiculate from a broad subtruncate base, glabrous, $\frac{1}{6}$ in. long. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, glabrous outside, on pedicels about equalling them in flower and exceeding them in fruit, 2–3 together; common peduncle ranging up to $\frac{1}{2}$ in., glabrous, bibracteolate at the top. Calyx-limb truncate. Corolla campanulate, glabrous except the deflexedly bearded throat; lobes 5. Anthers subsessile, exserted, glabrous or very nearly so. Stigma shortly exserted, capitate, 5-lobed; ovary 5-celled. Fruit 5–3-celled and -ribbed, $\frac{1}{3}$ in. long.

Upper Guinea. Muni River, 1° N. Lat., *Mann!* Gambia, *Park!*
Nile Land. Djur-land, Ghattas, *Schweinfurth!*
Lower Guinea. Loango, *Soyaux!*
A specimen from Delagoa Bay, collected by Forbes, resembles this species, but differs by rather smaller leaves and by a 3-celled ovary.

7. **V. umbellulata,** *Hiern.* Glabrous. Branches roundedly 4-sided, pallid, rigid; shoots compressed, herbaceous, green, supra-axillary, opposite, erect-patent. Leaves elliptical, acuminate at both ends or at least at the apex, chartaceous, 2–3 by $\frac{2}{3}$–$1\frac{1}{6}$ in., rather paler beneath; lateral veins about 4–5 pairs, slender, not conspicuous; petiole $\frac{1}{8}$ in.; stipules with a long erect linear cusp from a short broad base, $\frac{1}{5}$–$\frac{1}{4}$ in. long, interpetiolar, having a ring of hairs inside the base. Flowers $\frac{1}{4}$ in. long, on slender equalling or shorter pedicels, 5–7 together, umbellate; bracteoles minute or wanting; common peduncle $\frac{1}{8}$ in. long or shorter, bracteate at the apex. Calyx truncate, glabrous; limb very short, entire. Corolla-tube $\frac{1}{8}$ in. long; throat very thinly bearded; lobes 5, ovate, revolute, scarcely equalling the tube, not caudate. Anthers ovate, short, glabrous. Ovary 5-celled; stigma capitate-globose, shortly exserted.

Upper Guinea. Cape Coast, *Herb. Mus. Brit.*

8. **V. concolor,** *Hiern.* From a small shrub to a small tree of 10–15 feet, unarmed, nearly glabrous or somewhat shaggy on the young parts. Branches terete, ashy; branchlets usually alternate. Leaves oval, acuminate, obliquely rounded or somewhat narrowed at the base, membranous, of the same light green colour on both sides (when dry), glabrate or scattered with hispid hairs especially on the midrib beneath, usually with little hairy tufts in the (glandular) pits

at the axils of the 4–5 pairs of lateral veins beneath, $1\frac{1}{2}$–3 by $\frac{2}{3}$–$1\frac{1}{2}$ in.; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., hispid or glabrate; stipules apiculate from a broad subtruncate base, $\frac{1}{8}$–$\frac{1}{4}$ in. long, covering a ring of pilose hairs. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, glabrous outside; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long, glabrous, 3–8 together, on a short common peduncle which is bibracteolate at the top. Calyx-limb truncate. Corolla-tube barrel-shaped, glabrous except the throat; lobes 5, ovate, subapiculate. Anthers exserted, rugulose. Ovary 5-celled; style rather exceeding the corolla; stigma capitate, 5-lobed.

Upper Guinea. Prince's Island, *Mann!* Niger, *Barter!*

The following specimens are doubtful:—

Upper Guinea. Prince's Island, *Barter!* Leaves ranging up to $4\frac{1}{2}$ by 2 in. Fruit $\frac{1}{3}$ in. long diameter, 5-celled, 5-costate.

Lower Guinea. Annobon Island, *Burton!* a poor specimen, with anthers apparently included.

9. **V. membranacea,** *Hiern.* A small glabrous unarmed shining tree. Branches terete, reddish brown, those of the year green. Leaves oval, obtusely acuminate or cuspidate, more or less obliquely narrowed at the base, membranous, of the same light green colour on both sides (when dry), 3–4 by $1\frac{1}{3}$–$2\frac{1}{4}$ in.; lateral veins 6–8 pairs, slender; petiole $\frac{1}{5}$–$\frac{1}{4}$ in.; stipules apiculate from a broad truncate base, glabrous, $\frac{1}{8}$–$\frac{1}{5}$ in. long, deciduous, covering a ring of shaggy caducous hairs. Flowers about $\frac{1}{5}$ in. long (when expanded), glabrous outside; pedicels slender, glabrous, 8–12 together, $\frac{1}{3}$–$\frac{1}{5}$ in. long, subumbellately arranged on an abbreviated glabrous bracteolate common peduncle. Calyx-limb truncate. Corolla-tube barrel-shaped, wider than the calyx-limb, glabrous except the throat; lobes 5, ovate, mucronulate, whitish inside. Anthers exserted, brown. Ovary 3–4-celled; style glabrous; stigma subcapitate, shortly exserted, green.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

10. **V. velutina,** *Hiern.* An unarmed bush with young parts and leaves covered with a pale-tawny tomentum. Branches terete, patent, mostly alternate. Leaves oval, mostly rounded at both ends, subsessile, subcoriaceous, 1–3 by $\frac{3}{4}$–$1\frac{1}{2}$ in.; lateral veins about 5–6 pairs, inconspicuous; stipules ovate, apiculate, short. Flowers $\frac{1}{4}$ in. long, pentamerous, in very condensed panicles, tomentose outside, crowded in lateral clusters, several together, below the new shoots. Calyx-lobes lanceolate, silky inside, $\frac{1}{8}$ in. long, persistent. Corolla-lobes lanceolate, caudate-acuminate, shining and glabrous or nearly so inside; tube shaggy inside. Anthers small, glabrous. Disk glabrous. Ovary 5-celled. Style glabrous, equalling the corolla; stigma capitate, subcalyptriform, 5-sulcate; 5-lobuled at the tip. Fruit fleshy, globose.

South Central. Batoka country, *Kirk!*

Mozamb. Distr. Moramballa from the base to 1900 ft. alt., *Kirk!*

11. **V. pauciflora,** *Schweinf. mss. in herb.* A spinous shrub, 15 feet high. Branches erect-patent, opposite or alternate, terete; spines supra-axillary, opposite, erect-patent, $\frac{1}{12}$–$\frac{1}{3}$ in. long; branchlets pubescent. Leaves ovate or oval, obtusely acuminate, rounded or

emarginate (the uppermost ones sometimes narrowed) at the base, membranous or at length chartaceous, glabrate or with scattered short hispid hairs on the midrib, paler beneath, very shortly petiolate, 1–2 by $\frac{1}{2}$–1 in.; lateral veins about 4 pairs, inconspicuous; stipules apiculate from a broad base, small. Flowers $\frac{1}{4}$ in. long (when expanded), solitary or two together; pedicel shorter than the flower; peduncle axillary, slender, puberulous, $\frac{1}{6}$–$\frac{3}{8}$ in. long, bibracteolate at the top. Calyx turbinate, truncate, glabrous. Corolla glabrous outside; throat bearded; lobes 6 or 8, lanceolate, caudate-acuminate. Anthers exserted. Ovary 3–4-celled; stigma 3–4-lobed, capitate, exserted; lobes imbricated. Fruit $\frac{1}{3}$ in. long, 3–4-ribbed and -celled.

Nile Land. Djur-land, *Schweinfurth!* Niamniam-land, *Schweinfurth!*

12. **V. tetraphylla,** *Schweinf. mss. in herb.* A puberulous shrub, 20 feet high. Branches opposite, roundly foursided, spinous, sub-scandent, patent, dull-reddish; spines patent, subulate tapering from a robust base, $\frac{1}{2}$–1 in., decussate or opposite to a short spine-like branchlet, supra-axillary. Leaves crowded on the abbreviated lateral shoots, opposite, pseudo-verticillate in fours, oval, rounded or obtuse at apex, wedge-shaped or obtuse at the base, chartaceous, ciliolate, of the same yellowish green on both sides when dry, 1–1$\frac{1}{2}$ by $\frac{1}{2}$–$\frac{3}{4}$ in.; lateral veins about 4 pairs, inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. hispidulous; stipules apiculate from an ovate base, small. Flowers 4–5-merous, $\frac{1}{10}$–$\frac{1}{8}$ in. long on short hispidulous pedicels, a few together, in very abbreviated axillary clusters, precocious. Calyx-teeth small, subulate, spreading, glabrous. Corolla hispidulous outside; throat bearded; lobes lanceolate, acute. Anthers subsessile, exserted. Ovary 5–4-celled; stigma exserted, sulcate.

Nile Land. Djur-land, *Schweinfurth!*
Habit of *V. spinosa,* Roxb., but differs by the hairy surface of the corolla.

51. **FADOGIA,** Schweinf.; Benth. et Hook. f. Gen. Pl. ii. 111 (excl. syn.).

Calyx-tube campanulate or turbinate; limb truncate or 5–10-dentate or 5-lobed, small or not large, persistent. Corolla funnel-shaped or subcylindrical, exceeding the calyx; tube short or rather long, straight or arching, more or less hairy inside; throat not densely bearded; lobes 5–7, reflexed, ovate or lanceolate, valvate in æstivation, slightly induplicate near the tip, more or less apiculate at the back. Stamens 5–7, inserted at the mouth of the corolla; anthers oblong or lanceolate, glabrous, sessile or subsessile. Disk cushion-like, glabrous or hispid. Ovary (2–) 3–5-celled; style erect, glabrous, equalling the corolla or moderately exserted; stigma coroniform or hat-shaped, lobuled at the tip, lower margin free; ovules solitary, anatropous, pendulous from below the apex. Drupe composed of 3–5 (or by abortion 1) bony or crustaceous pyrenes. Seeds pendulous; testa membranous; albumen fleshy, uniform; embryo straight or somewhat curved, radicle short superior.—Erect unarmed herbaceous under-

shrubs or even small trees, with 3–5-whorled leaves, subulate stipules from a broad base or lanceolate, and small or moderate-sized flowers not all fertile, few or several together arranged in axillary fascicles or in short panicles or clusters.

A genus confined to the African continent, consisting of one or more Cape (Transvaal and Natal) species, besides the following :—

Corolla $\frac{1}{6}$–$\frac{1}{4}$ in. long.
- A small tree, with precocious flowers. Disk hispid . . 1. *F. leucophlœa.*
- Herbaceous undershrubs. Flowers not or rarely precocious. Disk glabrous.
  - Calyx-segments 5–6, linear, foliaceous . . . . . 2. *F. Zeyheri.*
  - Calyx-lobes 5, rounded, not minute . . . . . 3. *F. agrestis.*
  - Calyx-teeth 5–10, subulate, small, not all minute . 4. *F. Cienkowskii.*
  - Calyx truncate, entire or with minute subulate teeth.
    - Leaves oval, 1–2$\frac{1}{2}$ in. long . . . . . 5. *F. glaberrima.*
    - Leaves narrowly elliptic-lanceolate, 1$\frac{1}{2}$–4 in. long . 6. *F. stenophylla.*

Corolla $\frac{3}{4}$–1 in. long.
- Calyx truncate, entire. Flowers 1–4 together; pedicels $\frac{1}{8}$–$\frac{3}{8}$ in. long, raised on a short common peduncle. Corolla glabrous outside.
  - Corolla-tube straight or nearly so; lobes 6–7. Leaves wedge-shaped at the base . . . . . 7. *F. fuchsioides.*
  - Corolla-tube arching; lobes 5. Leaves rounded or emarginate at the base . . . . . 8. *F. ancylantha.*
- Calyx-teeth linear, subulate, twice the length of the tube. Flowers fasciculate; pedicels $\frac{1}{2}$ in.; corolla shaggy outside . . . . . 9. *F. lactiflora.*

1. **F. leucophlœa,** *Schweinf. mss. in Herb. sub* Vangueriâ. A small puberulous tree, 15 feet high. Branches with soft pale at length quite white bark, erect-patent. Leaves ternate, oval, obtuse at both ends, very shortly petiolate, coriaceous, asperous above, pale and harshly tomentellous beneath, 2–3 by 1–1$\frac{1}{4}$ in.; lateral veins about 6 pairs; stipules caducous. Flowers precocious, (as well as the fruits) on leafless branches before the development of the fresh leaves, greenish-white, $\frac{1}{6}$–$\frac{1}{5}$ in. long, on very short pedicels, several together in crowded clusters, tawny-tomentose outside. Calyx $\frac{1}{10}$ in long, teeth oval, obtuse, 5, about equalling the tube, subequal, hairy on both sides. Corolla-lobes 5, lanceolate, acute, about equalling the tube, subequal. Disk hispid. Ovary 5-celled. Stigma scarcely exserted. Fruit ribbed or oblique, $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; pyrenes 3–1.

Nile Land. Bongo-land, *Schweinfurth!* in flower; Mittu-land, *Schweinfurth!* n fruit.

2. **F. Zeyheri,** *Sond. in Linnæa*, xxiii. 56. A glabrescent dwarf undershrub. Branches angular, decumbent or ascending. Leaves oblanceolate or narrowly elliptical, obtuse or somewhat narrowed at the apex, attenuate at the base into a short petiole, ternate or the uppermost ones opposite, net-veined, green on both sides, rather or scarcely paler beneath, thinly and firmly coriaceous, 2$\frac{1}{2}$–6 by $\frac{1}{2}$–1$\frac{3}{8}$ in.; lateral veins about 3–5 pairs, stipules ovate or lanceolate, $\frac{1}{5}$–$\frac{1}{4}$ in. long.

Flowers pedicellate, in axillary and lateral pedunculate bracteolate hispidulous or glabrate panicles, 1–2 in. long; common peduncles ranging up to 1 in.; bracteoles lanceolate or linear, like the calyx-segments. Calyx $\frac{1}{6}$–$\frac{1}{4}$ in. long; tube globose, hispid or glabrate; segments 5–6, linear, foliaceous, $\frac{1}{8}$–$\frac{1}{5}$ in. long, spreading. Corolla $\frac{1}{3}$ in. long; tube clothed inside with reflexed silky hairs; throat naked; segments glabrous. Disk glabrous. Ovary 2 (–3–5)-celled; style filiform; stigma truncate at both ends (Sonder). Drupe oblique, 1–1$\frac{1}{4}$ in. long.—*Vangueria Zeyheri*, Sond. in Harv. et Sond. Fl. Cap. iii. 15.

South Central ?. (In fruit), A.D. 1872, *T. Baines!*

Occurs also in stony places in woods at Macalisberg in the Transvaal Republic.—The calyx-segments are very like those of the genus *Cuviera*.

3. **F. agrestis,** *Schweinf. mss. in Herb.* A tawny-tomentellous undershrub, 1$\frac{1}{2}$–2 feet high. Stems branched only at the base, erect, biennial. Leaves 3 together or occasionally the upper ones opposite, oval, rounded or obtusely pointed at the apex, wedge-shaped at the base, subsessile, thinly coriaceous, subscabrid above, pale tawny and velvety beneath, 1$\frac{1}{2}$–3$\frac{3}{4}$ by $\frac{3}{4}$–1$\frac{2}{3}$ in. or the lower ones smaller; lateral veins about 4–6 pairs; stipules $\frac{1}{8}$ in. long, hairy. Flowers $\frac{1}{4}$ in. long, hairy outside, on short or moderately long pedicels, several together in axillary short hairy panicles; common peduncle ranging to $\frac{3}{8}$ in.; pedicels to $\frac{2}{5}$ in. Calyx-lobes 5, rounded, equal, shorter than the tube, hairy on both sides. Corolla-lobes 5, ovate-lanceolate, mucronate, glabrous inside. Disk glabrous. Ovary 4–5-celled; stigma exserted. Fruit costate, glabrate, $\frac{1}{2}$ in. broad, tipped by the persistent calyx, 3–1-seeded.

Upper Guinea. Niger, Nupe, *Barter!*
Nile Land. Djur-land, *Schweinfurth!*

4. **F. Cienkowskii,** *Schweinf. Rel. Kotsch.* 47, *t.* 32. A hirsute undershrub, 2 feet high. Stems shrubby below, herbaceous above, erect, not much branched. Leaves 3–4 together, oval, obtuse or subcuspidate at the apex, wedge-shaped at the subsessile base, chartaceous, scattered with subappressed hispid hairs and at length rugose above, paler and hirsute at least on the veins beneath, 1$\frac{1}{2}$–4 by $\frac{3}{4}$–2 in., equalling or exceeding the internodes; lateral veins about 5–7 pairs; stipules much apiculate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, hirsute or nearly glabrous outside. Flowers $\frac{1}{5}$ in. long, on rather shorter pedicels, erect, 3–1 together, on a short common peduncle, axillary. Calyx puberulous or glabrate; teeth glabrate, subulate, short, $\frac{1}{10}$ in. long or less, somewhat unequal, 5 or with 1–5 extra minute ones intercalated. Corolla glabrous or puberulous outside; tube shortly funnel-shaped, pubescent inside; lobes 5–6, lanceolate, apiculate. Disk glabrous. Ovary 3–4 (–5)-celled. Drupe globose; pyrenes 5 or fewer.—*Rubiacea*, Schweinf. Beitr. Fl. Æthiop. p. 139, n. 713.

Upper Guinea. Niger, Nupe (flowers yellow), *Barter!*
North Central. Musgo, Sokoto, *E. Vogel!*
Nile Land. Fadoga, Sennaar, (corolla whitish), *Cienkowski.*
Lower Guinea. Golungo Alto and Huilla, in pastures, *Welwitsch!*

5. **F. glaberrima,** *Schweinf. in Herb.* A quite glabrous undershrub. Branches ternate. Leaves ternate, oval, obtuse, subsessile, wedge-shaped at the base, thinly coriaceous, paler beneath when dry, 1–2½ by ½–1⅛ in.; lateral veins about 6–7 pairs, very slender; stipules apiculate from a broad truncate base, $\frac{1}{12}$–$\frac{1}{8}$ in. Flowers ⅙ in. long, 3 together, with pedicels of $\frac{1}{12}$–⅙ in., on an axillary common peduncle of ⅙–⅓ in. Calyx truncate, $\frac{1}{15}$ in. long, with 5 minute teeth. Corolla-lobes 5–6, greenish-white, ovate, apiculate, $\frac{1}{10}$–⅛ in. long, nearly equalling the tube. Disk glabrous. Ovary (2–) 3–4-celled; stigma shortly exserted. Seeds ⅓ in. long.

Nile Land. Djur-land, *Schweinfurth!*

6. **F. stenophylla,** *Welw. ex Hook. f. mss. in Herb. Kew.* Glabrous, scarcely a foot high. Stems several, herbaceous from a woody base, erect. Leaves 3–4 in a whorl, narrowly elliptic-lanceolate, obtuse or apiculate, 1½–4 by ⅓–¾ in., sessile or subsessile; stipules subulate from a broad base, ⅛–⅙ in. long. Flowers ⅕–¼ in. long, occasionally precocious, in short drooping shortly pedunculate 2–4-fold racemose cymes; bracteoles filiform. Calyx-teeth minute, subulate. Corolla greenish violet, ⅓ in. long; tube broad; lobes broad, with a short dorsal horn. Unripe drupe oblique, ¼ in. diam.

Lower Guinea. Huilla, in meadows between Lopollo and Catumba, *Welwitsch!*

Near *Fadogia Zeyheri*, Sond., but calyx-teeth much shorter.

7. **F. fuchsioides,** *Welw. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. 85, *t.* 50. A glabrous shrub. Stems erect, 3-sided. Leaves shortly oval or obovate, rounded or acutely cuspidate at the apex, wedge-shaped at the subsessile base, thinly coriaceous, 1⅔–2⅔ by 1–1¾ in., ternate or occasionally the upper ones opposite; lateral veins about 4–5 pairs; stipules ⅙ in. long. Flowers glabrous outside, erect, 1 in. long, solitary or two together, with pedicels of ⅛–¼ in., on an axillary peduncle of ⅜–¾ in. Calyx truncate, entire, turbinate, ⅕–¼ in. long. Corolla straight; lobes 6–7, oval-lanceolate, acuminate, ⅜ in. long. Disk glabrous. Ovary 6-celled; stigma crown-shaped, exserted. Fruit subglobose, black, erect or drooping, ⅜–½ in. diam., at length ribbed; pyrenes 6 or fewer.—*Rubiacea* (481), T. Thoms. in Speke, Journ. App. p. 636 (1863).

Nile Land. Karagué, *Speke and Grant!* March, in fruit.
Lower Guinea. Huilla, *Welwitsch!* Pungo Andongo, *Welwitsch!*

8. **F. ancylantha,** *Schweinf. mss. in Herb.* A puberulous undershrub, 5 feet high. Leaves ternate, shortly oval, obtuse, subsessile, rounded and emarginate at the base, chartaceous, glabrate, 1–3 by ½–2 in.; lateral veins about 4–5 pairs; stipules apiculate from a broad truncate base, covering a ring of caducous white hairs, $\frac{1}{12}$–⅛ in. Flowers ⅚–⅞ in. long, 4–1 together with rather slender pedicels of ⅕–⅜ in., on a short common peduncle. Calyx truncate, entire, $\frac{1}{12}$ in. long, glabrous; tube campanulate. Corolla-tube yellowish green or whitish, oblong-funnel-shaped, arching, glabrous outside; lobes 5,

ovate, apiculate, $\frac{3}{16}$ in. long. Disk glabrous. Ovary 5-celled; stigma exserted, rather longer than thick, 10-angled, rounded and 5-lobed at the tip.

Nile Land. Djur-land, *Schweinfurth!* Niamniam-land, *Schweinfurth!*

9. **F. lactiflora,** *Welw. ex Hook. f. mss. in Herb. Kew.* Villous-tomentose throughout and pale when dry. Stems several, strict, herbaceous from a woody root-stock, 1–2 feet high. Leaves very uniformly 3–5-nately whorled, subsessile, elliptic-ovate, pointed or subacuminate, 1–1$\frac{3}{4}$ by $\frac{1}{2}$–1 in.; stipules subulate from a broad base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers fasciculate, $\frac{3}{4}$–1 in. long, white; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. Calyx-teeth linear-subulate, twice as long as the tube. Corolla-tube broadly cylindrical, white, villous, $\frac{1}{2}$–$\frac{3}{4}$ in. long; lobes with slender quasi-dorsal horns nearly as long as themselves, glabrous within except a silky band half way up. Fruit didymous, $\frac{3}{8}$–$\frac{1}{2}$ in. diam., glabrous, crowned with the villous calyx-lobes, edible.

Lower Guinea. Huilla, on shrubby hills near Lopollo, *Welwitsch!*

52. **CUVIERA,** DC.; Benth. et Hook. f. Gen. Pl. ii. 112—(*Pachystigma,* Hochst.; *Lagynias,* E. Mey).

Calyx-tube small, turbinate; limb 5-partite; segments linear or lanceolate, foliaceous, accrescent, elongated, spreading. Corolla subrotate, fleshy; tube short, furnished inside with deflexed hairs; throat glabrous; lobes lanceolate, acute or caudate-acuminate, induplicate-valvate in æstivation, about equalling the calyx-lobes, spreading. Stamens 5, glabrous, inserted at the mouth of the corolla, reflexed; filaments short, flattened. Anthers exserted, lanceolate, fixed by the base. Disk flat or depressed, glabrous. Ovary 5- or 3-celled; style glabrous or pilose-hirsute, short or of moderate length, rather robust; stigma subglobose, mitriform, sulcate; ovules solitary, pendulous. Fruit drupaceous, egg-shaped, truncate at the apex, angular or oblique; pyrenes 5 or fewer, 1-seeded.—Glabrous unarmed (in the species here described) shrubs or small trees, with opposite leaves and branches, broad apiculate stipules, flowers of moderate size not all fertile arranged in divaricately branched panicles, and foliaceous bracteoles as large as the calyx-lobes.

A genus of the following, as well as perhaps a few Cape species.

Ovary 5-celled.
- Style glabrous.
  - Leaves coriaceous, subequal at the base . . . . . 1. *C. acutiflora.*
  - Leaves chartaceous, oblique at the base . . . . . 2. *C. subuliflora.*
- Style pilose-hirsute . . . . . 3. *C. longiflora.*

Ovary 3-celled . . . . . 4. *C. trilocularis.*

1. **C. acutiflora,** *DC. in Ann. Mus. Par.* ix. p. 222, t. 15 (1807). A glabrous shrub, 15–20 feet high. Branches terete, divaricate, supra-axillary. Leaves oval-oblong, acuminate, subequal and rounded or somewhat narrowed at the base, coriaceous, glossy, rather or scarcely paler beneath, 4–10 by 1$\frac{3}{4}$–4 in.; some 4–6 in. wide (Benth.);

lateral veins about 6–10 pairs, not conspicuous; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. stipules ovate, apiculate, $\frac{1}{3}$ in. long, connate and sheathing below, keeled, hairy within. Flowers greenish, $\frac{3}{8}$–$\frac{2}{5}$ in. long in bud, on short slender pedicels, very numerous, in ample divaricately branched rather lax axillary and terminal shortly pedunculate dichotomous panicles of 2–6 in. diameter; bracteoles elliptic-linear, $\frac{3}{8}$–1 in. long, accrescent. Calyx green; segments $\frac{3}{8}$–$\frac{1}{2}$ in. long, linear-oblong, spreading, persistent. Corolla green and orange; segments lanceolate, caudate-acute, $\frac{3}{8}$ in. long, spreading. Ovary 5-celled; style glabrous. Fruit obliquely egg-shaped, $\frac{3}{4}$–$\frac{5}{6}$ in. long, obtusely 5-sided; pyrenes 5 or fewer.—DC. Prodr. iv. 468; Benth. in Hook. Niger Fl. 407; *C. africana*, Spreng. Syst. Veg. i. 760.

Upper Guinea. Sierra Leone, *Smeathman!* and others; Grand Bassa, *Th. Vogel!* Ambas Bay, *Mann!*

2. **C. subuliflora,** *Benth. in Hook. Niger Fl.* 407. An arborescent shrub or a small tree of 15 feet, glabrous. Branches subterete, smooth, opposite. Leaves oblong, shortly acuminate, oblique and hollowed or rounded or somewhat narrowed at the base, chartaceous, rather paler beneath, 6–15 by 2–4$\frac{3}{4}$ in.; lateral veins about 12–14 pairs, slender; petiole $\frac{1}{4}$ in. long; stipules deltoid, connate at the base, keeled near the apiculate apex, $\frac{1}{4}$–$\frac{1}{3}$ in. long, hairy within. Flowers numerous, on short pedicels, in divaricately branched axillary and lateral subsessile dichotomous panicles of 2–3 in. diameter; bracteoles linear, narrowed at both ends, $\frac{1}{2}$–1$\frac{1}{2}$ in. long, accrescent as well as the calyx-segments. Calyx whitish; segments narrowly or at length broadly linear, ranging up to 1 in. long. Corolla green; segments about $\frac{1}{2}$ in. long, lanceolate, caudate-acuminate. Style glabrous. Ovary 5-celled. Fruit 1 in. long, obliquely egg-shaped.

Upper Guinea. Fernando Po, on the sea-shore, *Th. Vogel! Mann!* Abòh, growing in the water, *Th. Vogel!*

3. **C. longiflora,** *Hiern.* A glossy shrub of 25 feet or a small tree of 20–25 feet, glabrous or nearly so. Branches subterete, smooth. Leaves oval-oblong, cuspidate, oblique and hollowed at the base, spreading, thinly coriaceous, paler beneath, 6–12 by 2–4 in.; lateral veins about 10–12 pairs, inconspicuous; petiole $\frac{1}{3}$–$\frac{3}{8}$ in.; stipules deltoid, keeled at the apex, hairy inside, $\frac{1}{4}$ in. long. Flowers 1$\frac{3}{4}$ in. diameter when expanded, on short pedicels, several together, in axillary panicles of 2–3 in. diameter; bracteoles narrowly elliptical, $\frac{2}{3}$–1$\frac{1}{2}$ in. long; peduncle about 1 in. Calyx-segments lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Corolla-segments $\frac{3}{4}$ in. long, lanceolate, acute. Anthers drooping. Ovary 5-celled; style pilose-hirsute below; stigma cernuous.

Upper Guinea. Cameroon Mountains, 2–3,000 feet alt., *Mann!*

4. **C. trilocularis,** *Hiern.* A small glabrous tree. Branches subterete, smooth. Leaves ovate-oval, acuminate, rounded and suboblique at the base, thinly coriaceous, glossy, of nearly the same colour on both sides, 4–5 by 1$\frac{3}{4}$–2 in.; lateral veins about 8–10 pairs; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules apiculate, ovate, keeled, $\frac{1}{6}$ in. Flowers on short

pedicels, several together, in the terminal or subterminal axils; panicles 1½–2 in. diameter; common peduncle about ½ in.; bracteoles lanceolate, ½–⅔ in. long. Calyx-segments greenish white, ½ in. long or rather more, linear-elliptical, acute, narrowed toward the base. Corolla shorter than the calyx; lobes lanceolate, caudate-acute. Style glabrous, stigma 10-sulcate. Ovary 3-celled.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

53. **ANCYLANTHOS,** Desf.; Benth. et Hook. f. Gen. Pl. ii. p. 112 (*Ancylanthus*).

Calyx-tube campanulate or subglobose, limb 5-partite, segments ovate lanceolate or subulate, persistent. Corolla tubular, somewhat arching inwards; tube furnished inside near the base with a ring of hairs; limb rather unequally 5-lobed, lobes ovate-lanceolate, erect-patent, apiculate, valvate in the bud, induplicately so towards the apex. Stamens 5, small, glabrous, subsessile, inserted at the throat of the corolla, included; anthers oval-oblong, obtuse. Disk hemispherical or nearly flat, fleshy, glabrous. Ovary 5-celled; style tapering, equalling the corolla or shortly exserted, glabrous; stigma shortly oblong, 10-sulcate, subcalyptriform, minutely 5-lobed at the tip; ovules solitary, pendulous. Fruit fleshy, globose, reddish; pyrenes 5 or fewer. Seeds pendulous, testa thin; albumen fleshy; embryo nearly the length of the seed, radicle superior.—Erect or decumbent rigid tomentose shrubs, with opposite coriaceous net-veined leaves, ovate or subulate stipules and tomentose drooping fasciculate flowers of moderate size.

A genus of six? species, all African, one being extra-tropical.

Calyx-lobes broad, ovate.
- Branches hoary or glabrate. Leaf-margins flat or nearly so — 1. *A. rubiginosus.*
- Branches clothed with rusty tomentum. Leaf-margins wrinkled . . . . . — 2. *A. fulgidus.*

Calyx-lobes subulate or lanceolate.

Tawny or hoary.
- Leaves ovate or elliptic-lanceolate, villous below . . . — 3. *A. cinerascens.*
- Leaves linear oblong or linear-oblong, very thick, margins recurved, with buffy wool below . . . . . — 4. *A. cistifolius.*

Rufous. Leaves oval . . . . . — 5. *A. Bainesii.*]

1. **A. rubiginosus,** *Desf. in Mém. Mus. Par.* iv. p. 5, t. 2 (1818). An ornamental shrub, with the habit of an *Azalea*, 3–5 feet high, branching from the base; branches strict rigid, glabrescent; branchlets supra-axillary, hoary, erect-patent, tips shortly tomentose. Leaves 1–3 by ⅔–1¾ in., elliptical or obovate, subcoriaceous, rather crass, obtuse retuse or with a short obtuse point, somewhat wedge-shaped at the base, above minutely scabrid hairs; veins closely reticulate; below ashy or pale tawny densely tomentose with simple and stellate hairs, nerves many reticulate, margins flat or nearly so; petioles ⅙–¼ in.; stipules about ¼ in. long, subulate from a broad connate base. Flowers in axillary somewhat whorled fascicles, chiefly below the leaves, appearing before the full development of the leaves, drooping; peduncles

pedicels and calyx shortly tomentose. Calyx-lobes broadly ovate, subacute or obtuse, $\frac{1}{5}$ in. long. Corolla 1 in. long, densely tomentose, rather rigid, bright brick-red; lobes $\frac{1}{4}$ in. long, ovate-subulate. Berry about $\frac{1}{2}$ in. diameter.—DC. Prodr. iv. p. 468; Welw. Apont. p. 588, n. 54 (1859).

Lower Guinea. Angola, *teste* Desfontaines; Rocky thickets from Ambaca to Pungo Andongo, *Welwitsch!*

2. **A. fulgidus,** *Welw. mss.* A shrub of 3–5 feet, rather densely virgate-ramose. Branches rigid, stout, densely clothed with red tomentum, spreading; branchlets with paler almost velvety hairs. Leaves very rigidly coriaceous, 1–2 by $\frac{3}{4}$–$1\frac{3}{4}$ in., broadly ovate-cordiform, obtuse, margins recurved and waved, upper surface dark green subscabridly pubescent with sunken veins, under surface greenish white velvety tomentose with broad stout reddishly tomentose, midrib and many stout reticulate veins; petiole very short; stipules subulate from a broad base, $\frac{1}{4}$ in. long. Flowers as in *A. rubiginosus*, but calyx-lobes rather more obtuse, $\frac{1}{5}$ in. long, and corolla rather shorter and more densely tomentose and of a brighter more orange red, lobes ovate, apiculate. Berry about $\frac{2}{3}$–$\frac{3}{4}$ in. diameter; seeds $\frac{1}{3}$ in. long.

Lower Guinea. Angola, Huilla district, in the thickets and rocky woods, alt. 4000–5000 feet, from Mumpulla to Lopollo, *Welwitsch!*

3. **A. cinerascens,** *Welw. mss.* An erect shrub about 4 feet high, pale tawny-tomentose when young; branches erect-patent, supra-axillary, rather slender, rigid, densely clothed with short soft tomentum. Leaves $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{2}{3}$ in. elliptical or oblong, obtuse or subacute at the apex, rounded or somewhat wedge-shaped at the base, rather scabridly hairy above, pale tawny or grey-white, softly or villous-silky beneath; petiole very short. Flowers in dense fascicles at the lower nodes of the branches, shortly pedicellate. Calyx $\frac{1}{4}$–$\frac{1}{3}$ in. long, densely silky tomentose, lobes subulate-lanceolate. Berry yellowish red, as in *A. rubiginosus*, nearly $\frac{1}{2}$ in. long.

Lower Guinea. Angola, in rather dense woods of Mutollo in the Pungo Andongo district, alt. 3500 feet, *Welwitsch!*

4. **A. cistifolius,** *Welw. mss.* A shrub $1\frac{1}{2}$–3 feet, sparingly branched. Branches rigid, stout, black-hoary, naked below; branchlets tawny-tomentose. Leaves rigidly coriaceous, 3–5 by $\frac{5}{8}$–$\frac{3}{4}$ in. narrowly linear or oblong-lanceolate, acute at the apex, subobtuse at the base, above with scattered curly short hairs and rufous villous midrib, buff-coloured and woolly beneath with villous stout midrib and obscure lateral nerves, margins revolute; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules lanceolate-subulate, equalling or exceeding the petiole. Flowers in dense axillary subglobose fascicles; peduncles pedicels and calyx shaggy with tawny hairs. Calyx-lobes subulate-lanceolate, subacute, as long as the tube, about $\frac{1}{8}$ in. long, persistent. Berry of the genus (Welw.), $\frac{3}{8}$ in. long; pyrenes about 4.

Lower Guinea. Angola. Sporadic in Mimosa woods in the Serra de Pedras do Guinga, alt. 3500 feet, *Welwitsch!*

5. **A. Bainesii,** *Hiern.* Stems and branches terete, glabrate below, rufous hispid-velutinous above. Leaves opposite, oval, somewhat narrowed at both ends, at first tawny-velvety on both sides, at length asperous and deep green above, subcoriaceous, 3–4 by 1½–2 in.; lateral veins about 5–6 pairs; petiole ⅕–¼ in., hairy; stipules lanceolate, acuminate, ⅕–¼ in. Flowers pentamerous, tomentose outside, ¾ in. long, precocious, 3–5 together, on tomentose pedicels of ¼–⅜ in., raised on a short lateral common peduncle. Calyx-lobes lanceolate, acute, ¼–⅜ in. long, persistent, erect. Corolla rufous-tomentose outside, not bearded; tube ⅔ in. long; lobes lanceolate, ¼ in., reflexed, acute. Ovary 5-celled. Fruit fleshy, globose, ⅔–¾ in. diameter, 1–2-seeded. Seed ½ in. long; albumen uniform; embryo somewhat curved, ⅜ in. long, cotyledons linear, radicle very short.

South Central ? *T. Baines!* 23° S. Lat., *Chapman and Baines!*

54. CRATERISPERMUM, Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 112.

Calyx-tube turbinate; limb coriaceous, hemispherical, subentire or 5-toothed. Corolla funnel-shaped or shortly salver-shaped; tube rather short; throat hairy; limb 5-partite, lobes ovate, more or less pubescent towards the base inside, spreading, valvate (narrowly induplicate) in the bud. Stamens 5, inserted on the throat of the corolla, glabrous, more or less exserted; filaments half the length of or exceeding the linear anthers, inserted at the back rather above the base. Disk fleshy, annular, glabrous. Ovary 2-celled, fleshy; style filiform, glabrous, subclavate or fusiform, rather dilated and bifid at the tip or divided into 2 recurved slender branches; ovules solitary, pendulous. Berry pisiform, obliquely globular, smooth, 2-seeded; endocarp papery. Seed pendulous, hemispherical; albumen fleshy, uniform; embryo small, radicle superior.—Quite glabrous shrubs, of a yellowish green colour, with subterete branches compressed towards the extremities, opposite net-veined leaves, connate persistent stipules, and rather small white flowers in subcapitate pedunculate bracteolate clusters.

A small genus comprising one species from the Seychelles and the following.

Leaves obovate or oval. Flowers several or many together.	
Filaments exceeding the anthers. Corolla funnel-shaped.	
Leaves closely net-veined. Style included	1. *C. laurinum.*
Leaves less closely net-veined. Style exserted . .	2. *C. cerinanthum.*
Filaments half the length of the anthers or shorter. Corolla-tube cylindrical.	
Leaves obovate. Calyx-limb not longer than the ovary	3. *C. brachynematum.*
Leaves oval. Calyx-limb longer than the ovary . .	4. *C. Schweinfurthii.*
Leaves elliptical-oblong. Flowers few together . . .	5. *C. montanum.*

1. **C. laurinum,** *Benth. in Hook. Niger Fl.* 411. Leaves obovate-oval, cuspidate, wedge-shaped at the base, thinly coriaceous, of the

same yellowish colour on both sides when dry, closely net-veined, 2–9 by $\frac{3}{4}$–$3\frac{1}{3}$ in.; lateral veins about 8 pairs; petiole $\frac{1}{3}$–$\frac{2}{3}$ in.; stipules $\frac{1}{6}$–$\frac{1}{4}$ in. long, connate at base, subtruncate or subapiculate. Flowers about $\frac{1}{4}$ in. long, sessile or subsessile, in dense pedunculate rather supra-axillary trichotomous clusters of $\frac{1}{2}$–1 in. diameter; common peduncle $\frac{1}{2}$–$\frac{3}{4}$ in., robust; bracteoles ovate, the uppermost connate, hemispherical. Calyx-limb $\frac{1}{20}$–$\frac{1}{15}$ in. diameter, not longer than the ovary. Anthers exserted, shorter than the filaments. Corolla funnel-shaped; limb $\frac{1}{4}$–$\frac{3}{8}$ in. diameter. Style included, bifid. Fruit $\frac{1}{6}$–$\frac{1}{4}$ in. diameter.—*Coffea laurina*, Poir. in Lam. Encycl. Méth. Suppl. ii. 14 (1811); Smeathm. ex DC. Prodr. iv. 499.

Upper Guinea. Sierra Leone, *Smeathman! Afzelius!* and others; Senegambia, *Heudelot!* Bagroo River (beaten up with grass, gives a yellow dye) *Mann!*

2. **C. cerinanthum,** *Hiern.* A shrub, 8 feet high. Leaves obovate-oval, subcuspidate, narrowed at the base, firmly chartaceous, of the same yellowish colour on both sides when dry, net-veined, 2–5 by $\frac{3}{5}$–$2\frac{1}{4}$ in.; lateral veins about 6–8 pairs; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules $\frac{1}{10}$–$\frac{1}{6}$ in. long, sheathing, subtruncate. Flowers $\frac{1}{4}$–$\frac{1}{3}$ in. long, sessile or subsessile, crowded, 5—many together, at the end of a common peduncle of $\frac{1}{2}$–$\frac{3}{4}$ in., rather supra-axillary, forming clusters of about 1 in. diameter; bracteoles ovate, small. Calyx-limb $\frac{1}{15}$–$\frac{1}{12}$ in. diameter, 5-toothed, fimbriate-ciliolate, longer than the ovary. Corolla-tube funnel-shaped; limb $\frac{2}{5}$ in. diameter, white, of waxy texture. Filaments longer than the exserted anthers. Style slender, cleft, exserted.

Upper Guinea. Prince's Island, *Mann!* Niger River, Lagos, *Barter!*

3. **C. brachynematum,** *Hiern.* Leaves obovate, narrowly acuminate, wedge-shaped at the base, firmly chartaceous, of the same yellowish colour on both sides when dry, net-veined, 2–$4\frac{1}{2}$ by 1–$1\frac{2}{3}$ in.; lateral veins about 6–7 pairs; petiole $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules sheathing, subtruncate, $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers $\frac{1}{4}$ in. long, sessile or subsessile, crowded, several together in small pedunculate rather supra-axillary clusters; peduncle about $\frac{1}{5}$–$\frac{1}{4}$ in.; bracteoles broadly ovate, clasping, upper connate. Calyx-limb not longer than the ovary, minutely toothed. Corolla-tube cylindrical; limb $\frac{1}{4}$ in. diameter; lobes oblong. Anthers nearly included, twice as long as the filaments. Style clavate above, bifid at the apex.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson! Dr. Robb!*

4. **C. Schweinfurthii,** *Hiern.* Undershrub. Leaves oval, acutely acuminate, wedge-shaped at the base, thinly coriaceous, pale yellowish green on both sides in the dry state, net-veined, 5–6 by $1\frac{3}{4}$–$2\frac{1}{4}$ in.; lateral veins about 6 pairs, not conspicuous; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules broadly ovate, mucronulate, $\frac{1}{5}$–$\frac{1}{4}$ in. long, connate at the base. Flowers without scent, white, $\frac{1}{3}$ in. long, sessile, several together in small rather supra-axillary pedunculate heads; common peduncle solitary, $\frac{1}{3}$–$\frac{3}{8}$ in. long; bracteoles broad, obtuse, shorter than

the calyx, ciliolate, clasping. Calyx-limb longer than the ovary, with 5 depresso-deltoid teeth. Corolla-tube subcylindrical; lobes linear-oblong nearly as long as the tube. Anthers partly included; filaments very short. Style bidentate. Berry black-purple, ovoid, $\frac{3}{8}$ in. long. Seed solitary, deeply excavated on the face.

Nile Land. Niamniam-land, by streams, Boddo, *Schweinfurth!*

5. **C. montanum,** *Hiern.* A small tree, 20 feet high. Leaves elliptic-oblong, narrowed at both ends, thinly coriaceous, green on both sides when dry, net-veined, 2–6 by $\frac{2}{3}$–$1\frac{2}{3}$ in.; lateral veins about 6–9 pairs, slender, not conspicuous; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules broadly ovate, apiculate, connate below, shorter than the petiole. Flowers few together, subsessile, in small rather supra-axillary pedunculate heads; common peduncle solitary, $\frac{1}{4}$–$\frac{3}{8}$ in. long; bracteoles broadly ovate, mucronulate, clasping, glabrous. Calyx-limb longer than the ovary, with 5 short broad mucronulate glabrous teeth. Corolla unknown.

Upper Guinea. Summit of the Peak of St. Thomas, *Mann!* Mucumbrara, St. Thomas, *Welwitsch!* (leaves yellowish green).

55. **IXORA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 113.

Calyx-tube ovoid, often bracteolate at the base; limb short, 4- or rarely 5-toothed or shortly lobed or truncate and entire, persistent. Corolla salver-shaped or shortly so; tube cylindrical, usually slender; throat naked or somewhat bearded; limb spreading, 4- or rarely 5-partite, lobes shorter than or equalling the tube, dextrorsely contorted in the bud (as seen from inside). Stamens 4 or rarely 5, inserted on the throat or at the mouth of the corolla, more or less exserted, glabrous; filaments short; anthers linear, usually apiculate, spreading or erect, fixed by the back near the base. Disk fleshy, glabrous. Ovary 2-celled; style filiform, glabrous, equalling or shortly exceeding the tube of the corolla, with two short spreading or recurved rarely erect or connate branches; ovules solitary, peltately inserted at the middle of the septum, amphitropous; micropyle inferior. Berry pisiform, subdidymous or subglobose or oblique, coriaceous or fleshy, 2–1-celled; pyrenes 2–1. Seeds convex on the back, concave on the face; umbilicus ventral; testa membranous; albumen cartilaginous; embryo dorsal, curved, cotyledons foliaceous, radicle terete, inferior. —Glabrous or glabrescent shrubs or small trees, with opposite evergreen leaves, and white or red flowers often elongated, arranged in terminal or rarely lateral bracteolate cymes.

A large genus occurring throughout the tropics, especially in the East Indies.

Inflorescence trichotomously branched. Flowers $\frac{1}{5}$–3 in. long.
Flowers 2–3 in. long. Inflorescence pedunculate.
Leaves all subsessile. Bracteoles ovate . . . . . 1. *I. radiata*
Leaves petiolate except the uppermost ones. Bracteoles subulate . . . . . 2. *I. odorata.*

Flowers $\frac{1}{3}$–1 in. long.
  Inflorescence lax.
    Flowers 1 in. long. Inflorescence pedunculate . . 3. *I. laxiflora.*
    Flowers $\frac{1}{2}$ in. long.
      Corolla-lobes 5 (-4 ?) subacute. Calyx lobes ovate. Inflorescence shortly pedunculate . . . . 4. *I. Thomsoni.*
      Corolla-lobes 4, obtuse. Calyx truncate or nearly so. Inflorescence sessile . . . . . 5. *I. ripuria.*
    Flowers $\frac{1}{4}$ in. long, 4-merous. Inflorescence sessile. Corolla-lobes not longer than the tube . . . 6. *I. breviflora.*
    Flowers $\frac{1}{4}$ in. long, 5-merous. Inflorescence pedunculate. Corolla-lobes longer than the tube . . 7. *I. brachysiphon.*
  Inflorescence dense. Flowers $\frac{2}{3}$ in. long.
    Flowers tetramerous.
      Leaves 6 in. long; margins flat. Calyx truncate. Inflorescence sessile . . . . . 8. *I. guineensis.*
      Leaves 1–3$\frac{1}{2}$ in. long; margins recurved. Calyx-lobes ovate. Inflorescence pedunculate . . 9. *I. foliosa.*
    Flowers pentamerous . . . . . 10. *I. Soyauxii.*
  Inflorescence compact, short.
    Leaves $\frac{1}{4}$–1 in. broad. Calyx-lobes deltoid . . . . . 11. *I. inundata.*
    Leaves $2\frac{1}{3}$–$2\frac{1}{2}$ in. broad. Calyx subtruncate . . . . 12. *I. minutiflora.*
    Leaves $3\frac{1}{3}$–4 in. broad. Calyx-lobes broadly ovate . . 13. *I. modesta.*

1. **I. radiata,** *Hiern.* A large shrub, 12–20 feet high or more. Leaves oval or narrowly elliptical, acute or cuspidate, undulate and the uppermost ones subcordate at the sessile or subsessile base, firmly chartaceous, glossy, ranging up to 12 by 4 in.; lateral veins about 10–14 pairs; stipules connate below, ovate, apiculate, keeled above, $\frac{1}{3}$–$\frac{1}{4}$ in. long. Flowers 2–3 in. long, rose-coloured (Barter), sessile or subsessile, crowded into nearly simple or once or twice trichotomously branched clusters, diverging; common peduncle ranging up to $2\frac{1}{2}$ in.; bracteoles opposite, small, ovate, acute, the uppermost at the base of the calyx. Calyx-lobes short, broad, sometimes nearly obsolete. Corolla-tube slender; lobes oval-oblong, $\frac{1}{4}$ in. long or rather more, obtuse, puberulous inside. Anthers exserted, $\frac{1}{4}$ in. long. Style exserted to the extent of the corolla-lobes, bifid above. Fruit subdidymous or subglobose $\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{8}$ in. diameter, 2–1-celled and -seeded.

Upper Guinea. Niger River, Nupe, *Barter!* Lagos Island, *Barter!*
Nile Land. Niamniam-land, at Boddo, and at Lineduku, *Schweinfurth!*

2. **I. odorata,** *Hook. in Bot. Mag.* t. 4191. Branches subterete. Leaves oval-oblong, acutely acuminate, coriaceous, the lower ones 4–8 by $1\frac{1}{4}$–$2\frac{1}{2}$ in. or more and rounded at the base or narrowed into the robust petiole of $\frac{3}{8}$–$\frac{3}{4}$ in., the upper ones as well as the bracts smaller ovate rounded or emarginate at the sessile base; lateral veins about 9–12 pairs, inconspicuous; stipules ovate, apiculate, appressed, connate at the base, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Flowers white, fragrant, three together, subsessile, 2–3 in. long, many, in terminal dense trichotomous corymbose panicles of 4–10 in. diameter, bibracteolate at the base; bracteoles subulate, small, the uppermost at the base of the calyx; peduncle 1–3 in. long, bearing 1–2 pairs of foliaceous bracts. Calyx glabrous, $\frac{1}{3}$ in. long, urceolate; teeth ovate. Corolla-tube slender; limb about

1 in. diameter; lobes oval, obtuse, glabrous. Anthers partly included. Style exserted to half the length of the corolla-lobes, bifid at the tip. Fruit $\frac{2}{5}$ in. diameter—*I. Brunonis*, Hort. ex Walp. Rep. vi. p. 45, non Wall.

Mozamb. Distr. Mozambique, *Forbes!*
Occurs also in Madagascar.

3. **I. laxiflora,** *Smith in Rees Cycl.* xix. n. 8. From a shrub of 3–4 feet to a small bushy tree. Leaves oval-oblong or narrowly elliptical, more or less acuminate or acute, narrowed at the base sometimes very shortly so or rarely (especially the uppermost ones which are also smaller) rounded, chartaceous, variable in size, in some specimens ranging up to 9 by $2\frac{1}{2}$ in. besides the petiole, which ranges up to $\frac{2}{3}$ in.; lateral veins numerous, slender, spreading; stipules connate below, ovate, apiculate, keeled at least towards the apex, $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowers about 1 in. long when expanded, fragrant, on rather slender pedicels ranging up to $\frac{3}{8}$ in., in lax trichotomously branched pedunculate hemispherical terminal panicles of 2–8 in. diameter; common peduncle 1–2 in.; bracteoles small, opposite, ovate, acute, at the base of each ramification of the inflorescence, the uppermost at the base of the calyx. Calyx red, $\frac{1}{12}$ in. long, ovoid; teeth short, broad, obtuse, subconnivent. Corolla white, tinged with pink; tube slender, lobes $\frac{1}{4}$–$\frac{1}{2}$ in. long, obovate-oblong, obtusely pointed, more or less pubescent towards the base inside or obsoletely so. Anthers about $\frac{1}{4}$–$\frac{3}{8}$ in. long, exserted. Style exserted by the length of the corolla-lobes, at length bilobed above. Fruit $\frac{1}{4}$ in. long, $\frac{3}{8}$ in. diameter, didymous, red.—*Bot. Mag.* t. 4482; *I brachypoda*, DC. Prodr. iv. p. 488, calyx obscurely 5-dentate, according to De Candolle; *I. odoratissima*, Klotzsch in Schœnl. Bot. Nachl. 227, t. 1.

Upper Guinea. Sierra Leone, *Whitfield! Barter!* (Sugar Loaf Mountain) and others; Grand Bassam, *Middleton! Th. Vogel!* Bagroo River, *Mann!* Cape Palmas, *Ansell! Th. Vogel!* Senegambia, *Perrottet and Leprieur;* Fernando Po, *Mann!*

4. **I. Thomsoni,** *Hiern.* A shrub with terete branches. Leaves oval, acuminate, obtusely narrowed at the base, firmly chartaceous, glossy above, 2–4 by 1–2 in.; lateral veins about 6 pairs, slender; margins rather revolute; petiole $\frac{1}{8}$ in.; stipules much apiculate from a short broad connate base, $\frac{1}{6}$ in. long, caducous. Flowers white, nearly $\frac{1}{2}$ in. long when expanded, on glabrous rather slender pedicels of $\frac{1}{6}$–$\frac{3}{8}$ in., in lax trichotomous terminal shortly pedunculate panicles of 3–4 in. diameter; bracteoles ovate or lanceolate, small, ciliolate, the uppermost at the middle or base of the pedicels. Calyx campanulate, $\frac{1}{15}$ in. long, glabrous; lobes 5, ovate, subobtuse. Corolla glabrous on both sides; lobes 5 (–4 ?), oblong-lanceolate, subacute, equalling the tube, glabrous. Anthers exserted, sessile, $\frac{1}{6}$ in. long, caudate-apiculate. Style exceeding the corolla-tube by $\frac{1}{6}$ in., glabrous, bifid at the tip.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

5. **I. riparia,** *Hiern.* A shrub, 15 feet high. Branches ashy. Leaves elliptical, acuminate at both ends, chartaceous, pale at least

below when dry, 3–7 by 1–3 in.; lateral veins about 10–11 pairs, inconspicuous; petiole $\frac{1}{5}$–$\frac{1}{2}$ in.; stipules ovate, connate at the base. Flowers $\frac{1}{2}$ in. long, in company with the leaves, subsessile or on short obsoletely puberulous pedicels ranging up to $\frac{1}{8}$ in., in sessile terminal brachiate hemispherical panicles of about 3 in. diameter; bracts ovate, connate, small; bracteoles filiform, very small, opposite, the uppermost at or below the base of the calyx. Calyx red, $\frac{1}{15}$ in. long, glabrate; limb erect, scarcely cup-shaped, truncate or very shortly lobed, with 4 minute teeth. Corolla-tube slender; limb scarcely $\frac{1}{2}$ in. diameter; lobes 4, oblong, obtuse, obsoletely puberulous at the base inside. Anthers $\frac{1}{5}$ in. long. Style exserted by the length of the anthers.

Upper Guinea. Fernando Po, by the bank of the river, *Mann!*

6. **I. breviflora,** *Hiern.* A shrub, 15 feet high. Branches ashy. Leaves elliptical, narrowed at both ends, chartaceous, turning pale-reddish in the dry state, 4–7$\frac{1}{2}$ by 1$\frac{1}{2}$–2$\frac{1}{2}$ in.; lateral veins about 11–12 pairs, very slender; petiole $\frac{1}{3}$–$\frac{2}{3}$ in.; stipules ovate, apiculate, connate at base, $\frac{1}{4}$ in. long. Flowers $\frac{1}{4}$ in. long when expanded, on obsoletely puberulous pedicels ranging up to $\frac{3}{8}$ in., in trichotomous sessile brachiate panicles of 3–6 in. diam., terminal and lateral, usually terminating leafless branches; bracts opposite, connate, ovate, small; bracteoles opposite, filiform, very small, the uppermost subulate, minute, at or below the base of the calyx. Calyx green, obsoletely puberulous, $\frac{1}{15}$ in. long; limb shallow, concave; lobes short, broad, subapiculate. Corolla red; limb nearly $\frac{1}{2}$ in. diam.; lobes oval-oblong, obtuse, obsoletely pubescent towards the base inside. Anthers $\frac{1}{5}$ in. long. Style exserted to the length of the anthers, bifid above. Fruit subdidymous or subglobose, $\frac{1}{4}$–$\frac{1}{3}$ in. long.

Upper Guinea. Fernando Po, *Mann!*

7. **I. brachysiphon,** *Hiern.* A smooth glabrous glossy shrub. Branches terete, patent. Leaves elliptical, acuminate at both ends, chartaceous, 4–7 by 1$\frac{1}{4}$–2$\frac{1}{2}$ in.; lateral veins about 7–9 pairs, slender; petiole $\frac{1}{3}$–1 in.; stipules broadly ovate or subtruncate, apiculate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers $\frac{1}{5}$ in. long when expanded exclusive of the style and corolla-lobes, pentamerous, on slender bracteolate pedicels of $\frac{1}{4}$–$\frac{3}{8}$ in., in lax divaricately branched trichotomous pedunculate corymbose cymes of 3–4 in. diam.; common peduncle $\frac{1}{2}$–$\frac{2}{3}$ in.; bracteoles subulate, the upper ones very small. Calyx green, $\frac{1}{10}$ in. long, campanulate, ebracteolate, obtusely puberulous; limb 5-cleft; teeth ovate, keeled, apiculate. Corolla white, glabrous except the pubescent throat; tube very short, $\frac{1}{8}$–$\frac{1}{7}$ in.; lobes obovate-oblong, obtuse, $\frac{1}{4}$–$\frac{3}{8}$ in. long, reflexed. Anthers rather shorter. Disk glabrous. Ovules impressed on the fleshy placentas. Style glabrous, exserted by $\frac{1}{10}$–$\frac{1}{8}$ in., bidentate at the tip.

Upper Guinea. Bagroo River, *Mann!*

8. **I. guineensis,** *Benth. in Hook. Niger Fl.* p. 414. Branches terete. Upper leaves oval-oblong, subacuminate, obtusely narrowed

at the base, firmly chartaceous, of the same colour on the two surfaces, 6 by $2\frac{1}{2}$ in.; lateral veins about 6 pairs, slender, inconspicuous, margins flat; petiole $\frac{1}{4}$ in.; stipules connate at the base. Flowers tetramerous, $\frac{2}{3}$ in. long when expanded, very shortly pedicellate, several, in rather dense trichotomous terminal sessile panicles of 2 in. diam.; lower bracteoles pluri-setose from a short connate base, upper minute, subulate, at the base of the short pedicels. Calyx glabrous, $\frac{1}{15}$ in. long; limb truncate, subentire. Corolla-lobes oblong, obtuse, $\frac{1}{4}$ in. long, glabrous. Anthers exserted, $\frac{1}{5}$ in. long. Style exserted to the length of the corolla-lobes, bilobed above.

Upper Guinea. Guinea Coast, *Herb. Hook.!*

9. **I. foliosa,** *Hiern.* Much branched. Branches leafy, obtusely angular, ashy, compressed towards the extremities; bark transversely rimose. Leaves elliptical, somewhat narrowed or subacuminate at the apex, mucronulate, wedge-shaped or rounded at the base, rigidly coriaceous, glossy, 1–$3\frac{1}{2}$ by $\frac{1}{2}$–$1\frac{1}{2}$ in., margins recurved; lateral veins about 10 pairs, slender; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules caudate-apiculate from an oval connate base, $\frac{1}{4}$ in. long. Flowers tetramerous, $\frac{2}{3}$ in. long when expanded, on short bracteolate pedicels, in dense hemispherical trichotomous terminal petiolate panicles of $1\frac{1}{2}$–2 in. diam.; common peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in., bracteate; bracteoles decussate rigid ovate-lanceolate, the uppermost at the base of the calyx. Calyx $\frac{1}{15}$ in. long, glabrous, campanulate, bracteolate; limb concave; lobes ovate, obtuse. Corolla-tube slender; limb $\frac{1}{3}$–$\frac{3}{8}$ in. diam.; lobes oval, rounded, obsoletely puberulous inside near the base. Anthers $\frac{1}{6}$ in. long. Style exserted by the length of the anthers, bifid at the tip.—*Ixora,* sp., Hook. f. in Journ. Linn. Soc. Lond. vii. p. 197.

Upper Guinea. Cameroon Mountains, alt. 5000 ft., *Mann!*

10. **I. Soyauxii,** *Hiern.* A shrub, 4 feet high. Branches divaricate, terete, puberulous towards the extremities. Leaves oval, subacuminate, somewhat wedge-shaped at the base, glabrate, chartaceous, turning black in the dry state, $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{5}{8}$–$1\frac{1}{4}$ in.; lateral veins about 5 pairs, sometimes with little hairy depressions in the axils; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. long; stipules subulate from a very short broad base. Flowers pentamerous, white, $\frac{2}{3}$ in. long, on short pedicels ranging up to $\frac{1}{5}$ in. bracteolate at the base or middle, several together in globose subsessile short panicles of $1\frac{1}{2}$–2 in. diam. terminating the branches and lateral shoots. Calyx small, glabrous; limb 5-cleft; teeth ovate. Corolla glabrous on both sides, 5-lobed; leaves oval, mucronulate, spreading, $\frac{1}{6}$–$\frac{1}{5}$ in. long. Anthers narrowly linear, $\frac{1}{8}$ in. long, on filaments of half the length, exserted. Disk glabrous. Style glabrate, exserted by $\frac{3}{5}$–$\frac{1}{4}$ in., undivided, slender.

Lower Guinea. Loango, *Soyaux!*

11. **I. inundata,** *Hiern.* A shrub, 5 feet high. Branches terete or at the extremities compressed. Leaves narrowly elliptical, attenuate at both ends, thinly coriaceous, 1–6 by $\frac{1}{4}$–1 in.; lateral veins about 10 pairs, inconspicuous; petiole ranging up to $\frac{1}{3}$ in.; stipules ovate, spi-

culate, connate at the base, $\frac{1}{6}$–$\frac{1}{5}$ in. long. Flowers tetramerous, short, on short pedicels, crowded in short terminal sessile panicles of $\frac{1}{2}$ in.; bracteoles ovate, small, the uppermost at the base of the calyx. Calyx $\frac{1}{15}$ in. long, glabrous; limb concave; lobes deltoid, subapiculate. Corolla-tube apparently short; lobes oval, obtuse, $\frac{1}{8}$ in. long. Fruit subdimidiate-oblique, $\frac{1}{4}$ in. long or rather more.

Upper Guinea. Sierra del Crystal, *Mann!*

12. **I. minutiflora,** *Hiern.* A shrub, 8 feet high. Branches terete. Leaves elliptical, acuminate at both ends, firmly chartaceous, 6–8 by $2\frac{1}{3}$–$2\frac{1}{2}$ in.; lateral veins about 14 pairs, slender, inconspicuous; petiole $\frac{1}{4}$–$\frac{3}{8}$ in.; stipules ovate, apiculate, connate at base. Flowers sessile, very small, crowded in sessile very short terminal clusters; bracteoles subulate, at the base of the calyx, very small. Calyx glabrous, about $\frac{1}{30}$ in. long or perhaps rather more; limb subtruncate, with 4–5 minute teeth. Corolla-tube apparently very short; lobes 4, oval, obtuse.

Upper Guinea. Sierra del Crystal, *Mann!*

13. **I. modesta,** *Hiern.* A glabrous glossy shrub, 10 feet high. Branchlets terete, somewhat compressed towards the extremities. Leaves obovate-elliptical, narrowly acuminate, wedge-shaped at the base, membranous, 10–12 by $3\frac{1}{3}$–4 in.; lateral veins about 10–12 pairs; petiole $1\frac{1}{2}$–2 in.; stipules much apiculate from a broad ovate or subtruncate base, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Flowers tetramerous, small, subsessile, in very short dense bracteolate lateral panicles, near the ends of the branches; bracteoles ovate, not very small. Calyx about $\frac{1}{10}$ in. long, bracteolate; limb broader than the inferior portion, hemispherical, 4-cleft; teeth broadly ovate. Corolla glabrous except the bearded throat; lobes apiculate (in bud). Style glabrous, bidentate. Ovules solitary, immersed in the fleshy pendulous funicule or placenta.

Upper Guinea. Sierra del Crystal, *Mann!*

56. PAVETTA, Linn.; Benth. et Hook. f. Gen. Pl. ii. 114.

Calyx-tube turbinate or campanulate; limb 4- or very rarely 5-lobed or subtruncate, persistent or deciduous; lobes short or elongated. Corolla usually salver-shaped; tube cylindrical or funnel-shaped, usually slender; throat bearded or pubescent, sometimes glabrous; limb 4- or very rarely 5-partite, segments oval or oblong, spreading or reflexed, contorted dextrorsely (as seen from inside) in the bud. Stamens 4 or very rarely 5, inserted at the mouth of the corolla, exserted, spreading or reflexed; anthers linear, glabrous, nearly equalling the corolla-lobes, fixed by the back at or near the base, after flowering usually twisted; filaments short or half the length of the anthers. Disk annular, fleshy. Ovary small, 2-celled (very rarely 4-celled); style exserted by at least the length of the corolla-lobes, slender; stigma narrowly fusiform or slightly club-shaped, undivided or bidentate at the tip; ovules solitary, usually peltately immersed or

impressed on the fleshy placentas, amphitropous. Berry pea-shaped, rather fleshy; pyrenes 2, chartaceous. Seeds convex outside, concave or excavated on the inner face; umbilicus ventral; testa membranous; albumen horny, uniform, excavated on the inner face; embryo dorsal, curved, cotyledons foliaceous, radicle terete, inferior.—Shrubs or small trees with opposite or rarely ternate leaves, ovate apiculate stipules connate at the base, and white or greenish hermaphrodite flowers arranged in terminal or rarely axillary bracteolate corymbs.

A genus of considerable size chiefly inhabiting the tropical and subtropical regions of the old world. All our species appear to be endemic. The bracteoles are not at the base of the calyx, as is common in *Ixora*, but are placed lower down.

Inflorescence terminal and sometimes also subterminal (or terminating short lateral branches in *P. subcana*).
Calyx-lobes equal, open in æstivation.
Glabrous except the inflorescence.
Leaves elliptical or obovate, wedge-shaped at the base.
Calyx-limb subtruncate or half-cleft.
Style undivided. Leaves 2–9 in. long.
Stigma pubescent . . . . . 1. *P. brachycalyx.*
Stigma glabrous or puberulous.
Inflorescence glabrous, divaricately branched. Leaves 7–9 in. long . . 2. *P. Mannii.*
Inflorescence puberulous; branches not divaricate. Leaves 4–6½ in. long . . 3. *P. monticola.*
Style bidentate at the tip. Leaves 9–12 in. long 4. *P. bidentata.*
Calyx-limb deeply lobed, more than half cleft (*Crinitd*).
Leaves elliptical. Calyx $\frac{1}{12}$–$\frac{1}{5}$ in. long.
Style ½ in. long, about twice the length of the expanded flower . . . . . 5. *P. owariensis.*
Style 1 in. long, about three times the length of the expanded flower . . . . 6. *P. glaucescens.*
Style 1⅓ in. long, about four times the length of the expanded flower . . . . 7. *P. puberula.*
Leaves somewhat obovate. Calyx $\frac{1}{3}$ in. long . 8. *P. crebrifolia.*
Leaves oval, not much narrowed at the base.
Leaves membranous, not caudate-acuminate . . 9. *P. macrosepala.*
Leaves firmly chartaceous, caudate-acuminate . . 10. *P. neurocarpa.*
Leaves and branches more or less pubescent tomentose or hispid.
Calyx small, with 4 short deltoid teeth . . . . 11. *P. subcana.*
Calyx-teeth subulate.
Style exserted by ⅔–1 in. or less.
Corolla glabrous outside.
Flowers ½–¾ in. long (exclusive of the exserted style), slender . . . . . 12. *P. gracilis.*
Flowers 1–1½ in. long (exclusive of the exserted style), rather robust . . . . 13. *P. abyssinica.*
Corolla pubescent outside.
Corolla-lobes oval, mucronulate. Leaves oval . . . . . 14. *P. Oliveriana.*
Corolla-lobes acuminate. Leaves elliptical . 15. *P. mollis.*
Style exserted by 1½–2 in.
Corolla-throat pubescent. Branches glabrate . . . . . 16. *P. dolichosepala.*

Corolla glabrous throughout. Branches hispid . . . . . 17. *P. hispida.*
Calyx-lobes obovate-oblong, foliaceous . . . . 18. *P. genipæfolia.*
Calyx-lobes imbricate or contorted in æstivation or unequal (*Baconia*).
Leaves opposite. Flowers tetramerous.
Disk glabrous. Calyx-lobes imbricated subequal . . . . . 19. *P. Baconia.*
Disk hispidulous. Calyx-lobes unequal . . . . 20. *P. Hookeriana.*
Leaves ternate-verticillate. Flowers tetramerous or occasionally pentamerous . . . . . 21. *P. ternifolia.*
Inflorescence axillary or lateral.
Corymbs sessile or subsessile.
Nearly glabrous. Corolla-lobes about equalling the tube . . . . . 22. *P. gardeniæfolia.*
Leaves hoary-velvety beneath. Corolla-lobes about half the length of the tube . . . . . 23. *P. canescens.*
Corymbs on long peduncles.
Rigid. Corymbs ascending. Style exserted by 1½ in. 24. *P. rigida.*
Lax. Corymbs drooping. Style exserted by ¾–1 in. . 25. *P. gracilipes.*

1. **P. brachycalyx,** *Hiern.* A shrub, 6–10 feet high, glabrous in most parts. Branches terete. Leaves narrowly elliptical, acuminate at both ends, chartaceous, glabrous, paler and glaucescent beneath, 2–6½ by ¾–2 in.; lateral veins about 5–7 pairs, slender, often with glandular depressions in the axils; petiole ⅓–1 in.; stipules broadly ovate, caducous, $\frac{1}{10}$–$\frac{1}{6}$ in. long, connate at the base; upper internodes very short. Flowers ⅛–¼ in. long, tetramerous, sessile, on short puberulous minutely or obsoletely bracteolate pedicels, in dense globose subsessile or very shortly pedunculate divaricately branched terminal panicles of 2–3 in. diam.; common peduncle ⅛–¼ in. (or longer in the case of the subterminal lateral panicles which sometimes occur). Calyx $\frac{1}{20}$–$\frac{1}{15}$ in. long; adherent portion small, turbinate, puberulous; limb broader, hemispherical, nearly glabrate, $\frac{1}{12}$ in. diam., subtruncate or with 4 broad shallow subapiculate lobes. Corolla glabrous except within the bearded throat; lobes ⅛–$\frac{3}{16}$ in. long, reflexed, oval, obtuse. Anthers ⅛–$\frac{3}{16}$ in. long, at length twisted; filaments short. Disk hispidulous on the inner margin or glabrous. Ovules pendulous from a fleshy funicle or placenta. Style exserted by ⅛–$\frac{5}{16}$ in., glabrous below, pubescent at the fusiform undivided stigma or bidentate at the tip.

Upper Guinea. Cameroon Mountains, at 2–3,000 ft. (Disk hispidulous on the inner margin), *Mann!* Gaboon River (Disk glabrous; flowers smaller than in the former specimen), *Mann!* Sierra del Crystal (Disk glabrous; flowers very small; corolla yellow), *Mann!*

2. **P. Mannii,** *Hiern.* Glabrous, glaucescent. Branches deeply sulcate towards the extremities in the dry state. Leaves elliptical or slightly obovate, abruptly and narrowly acuminate, wedge-shaped at the base, membranous-chartaceous, rather paler beneath, 7–9 by 2⅔–3⅓ in.; lateral veins about 9 pairs; petiole ⅔–¾ in.; stipules from a broad ovate base. Flowers tetramerous, ¼ in. long when expanded exclusive of the style, on shorter pedicels, numerous, in divaricately branched sessile terminal ample corymbs of about 4 in. diameter; bracteoles

ovate, mostly obtuse, small. Calyx turbinate, ebracteolate, $\frac{1}{10}$–$\frac{1}{8}$ in. long; limb $\frac{1}{15}$–$\frac{1}{12}$ in. long, subtruncate or with 4 broad shallow rounded lobes. Corolla glabrous except the pubescent throat; lobes oval, obtuse, $\frac{1}{4}$–$\frac{5}{16}$ in. long, spreading or reflexed. Anthers nearly equalling the corolla-lobes; filaments short. Disk glabrous. Style exserted by $\frac{5}{16}$–$\frac{3}{8}$ in., glabrous except the minutely puberulous subfusiform stigma. Ovules solitary, impressed on the surface of the fleshy placentas.

Upper Guinea. "Cameroon River Collection," *Mann!*

3. **P. monticola,** *Hiern.* A shrub, 12–15 feet high, glabrous in most parts. Branches terete. Leaves elliptical or somewhat obovate, caudate-cuspidate, wedge-shaped at the base, rather glossy, of nearly the same colour on both surfaces, glabrous except slightly hairy tufts in the axils of the 7–9 pairs of lateral veins and occasionally of the tertiary veins, chartaceous, 4–$6\frac{1}{2}$ by $1\frac{1}{2}$–$2\frac{3}{4}$ in., the uppermost ones (bracts) about 3 by 1 in.; petiole $\frac{1}{2}$–1 in.; stipules broadly ovate or truncate, cuspidate, connate at the base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers tetramerous, $\frac{1}{4}$ in. long, on puberulous ebracteolate pedicels of $\frac{1}{8}$–$\frac{3}{8}$ in., in rather dense (not divaricately branched) corymbose panicles of 2–3 in. diameter; peduncle $\frac{2}{3}$ in. with 2 large foliaceous bracts at the top 3 in. by 1 in. Calyx $\frac{1}{6}$ in. long; limb campanulate, $\frac{1}{8}$ in. long, cleft, puberulous; lobes shortly ovate, obtuse, keeled. Corolla glabrous outside, pubescent near the throat inside; lobes oblong, $\frac{3}{8}$ in. long, reflexed. Anthers narrowly linear, exserted, scarcely as long as the corolla-lobes, at length twisted. Style exserted by $\frac{2}{5}$ in., puberulous above; stigma narrowly fusiform, undivided.

Upper Guinea. Summit of the Peak of St. Thomas, *Mann!*

4. **P. bidentata,** *Hiern.* A glossy pale-green shrub, 8 feet high, glabrous except the puberulous inflorescence. Branches somewhat compressed towards the extremities. Leaves narrowly elliptical, narrowed at both ends, membranous, 9–12 by $2\frac{2}{3}$–$3\frac{1}{2}$ in.; lateral veins about 13–14 pairs, slender; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in.; stipules much apiculate from a truncate base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers tetramerous, $\frac{1}{4}$–$\frac{1}{3}$ in. long, on puberulous equalling or shorter rather slender pedicels, numerous, in globose dense terminal sessile or shortly pedunculate corymbs of 3 in. diameter; bracteoles ovate, small. Calyx green, $\frac{1}{10}$–$\frac{1}{8}$ in. long, ebracteolate, obsoletely puberulous; limb hemispherical, broader than the small ovary; lobes 4, broad, shallow. Corolla glabrous except inside the pubescent throat, white; lobes $\frac{5}{16}$–$\frac{3}{8}$ in. long, oval, obtuse, spreading or reflexed. Anthers rather shorter than the corolla-lobes; filaments short. Disk glabrous. Style exserted by nearly $\frac{1}{2}$ in., bidentate at the tip, glabrous or puberulous opposite the throat of the corolla. Ovules solitary, impressed on the fleshy placentas.

Upper Guinea. Fernando Po, *Mann!*

5. **P. owariensis,** *P. de Beauv. Fl. Ow. et Ben.* i. 87, t. 52. A glabrous shrub, about 6 feet high. Branches terete. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, rather shining,

turning blackish in the dry state, 5–7 by 2–3 in.; lateral veins about 7–9 pairs, slender; petiole $\frac{5}{8}$–$1\frac{1}{4}$ in.; stipules ovate or apiculate from a broad base, $\frac{1}{8}$–$\frac{1}{5}$ in. long, caducous. Flowers $\frac{1}{4}$ in. long, tetramerous, white, on short slender ebracteolate pedicels in terminal corymbs of 2–4 in. diameter; common peduncle $\frac{1}{4}$–$\frac{3}{4}$ in. Calyx $\frac{1}{12}$ in. long; limb deeply 4-lobed; lobes ovate, obtuse. Corolla glabrous outside, pubescent within the throat; lobes oblong, scarcely equalling the tube, obtuse. Anthers equalling the corolla-lobes, two and a half times the length of the filaments. Disk glabrous. Style glabrous, exserted by $\frac{5}{16}$ in., undivided, rather thickened at the fusiform obtuse stigma. Fruit (immature) ovoid, $\frac{1}{3}$ in. long.—Benth. in Hook. Niger Fl. p. 414. *Ixora owariensis*, Poir. in Encycl. Méth. Suppl. iii. 207 (1813). Compare also *I. africana*, P. de Beauv. ex A. Rich. in Mém. Soc. Hist. Par. v. p. 117 (1834).

Upper Guinea. Oware, *P. de Beauvois;* Quorra, *Th. Vogel!*

6. **P. glaucescens,** *Hiern.* Glabrous in most parts, shining. Branchlets smooth. Leaves narrowly elliptical, acutely acuminate at both ends, chartaceous, pale and glaucescent beneath except the 8–9 slender pairs of lateral veins, 6–9 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., the uppermost (bracts) 4 by 1 in.; petiole $\frac{1}{2}$–2 in.; stipules subtruncate, connate, apiculate, glabrous, $\frac{1}{8}$–$\frac{1}{6}$ in. Flowers tetramerous, $\frac{1}{3}$ in. long, on minutely puberulous ebracteate pedicels of $\frac{1}{8}$–$\frac{1}{3}$ in., in globose sessile panicles of about 4 in. diameter. Calyx $\frac{1}{5}$ in. long, turbinate; limb $\frac{1}{6}$ in. long, minutely puberulous, deeply lobed; lobes ovate, puberulous, ciliolate, obtusely keeled, $\frac{1}{8}$ in. long. Corolla glabrous outside, pubescent inside above the middle of the tube; lobes ovate-oblong, reflexed, mucronulate, $\frac{1}{3}$–$\frac{3}{8}$ in. long. Anthers narrowly linear, about $\frac{1}{4}$ in. long, at length twisted, somewhat apiculate, exserted; filaments short. Style exserted by $\frac{5}{8}$ in., puberulous above, stigma narrowly fusiform, emarginate.

Upper Guinea. Fernando Po, *Mann!*

7. **P. puberula,** *Hiern.* A rather pale shrub, 10 feet high. Branchlets compressed or angular, shortly pubescent. Leaves elliptical, shortly acuminate, wedge-shaped at the base, membranous, glabrate above, puberulous at least on the principal veins beneath, 9–12 by $3\frac{1}{2}$–$4\frac{1}{2}$ in., or the uppermost (bracts) about 3 by $\frac{1}{2}$ in.; lateral veins about 9–10 pairs; petiole $\frac{2}{3}$–1 in., puberulous; stipules broadly ovate, apiculate, $\frac{3}{8}$ in. long. Flowers tetramerous, $\frac{1}{3}$ in. long, on puberulous ebracteolate pedicels of $\frac{1}{10}$–$\frac{1}{5}$ in. or less, in a repeatedly branched brachiate sessile panicle of 4–6 in. Calyx $\frac{1}{6}$ in. long, puberulous or subglabrous; limb deciduous, deeply lobed; lobes lanceolate or ovate, $\frac{1}{10}$–$\frac{1}{8}$ in. long, subacute. Corolla white, glabrous outside, pubescent inside about the middle of the robust tube; lobes linear or oblong, subapiculate, reflexed, half as long again as the tube. Anthers exserted, reflexed, $\frac{3}{8}$ in. long, narrowly linear, apiculate; filaments $\frac{1}{10}$ in. Style exserted by 1 in., minutely pubescent or glabrate except the puberulous fusiform emarginate stigma. Fruit (perhaps immature) $\frac{1}{4}$ in. diameter.

Upper Guinea. Sierra del Crystal, *Mann!*

8. **P. crebrifolia,** *Hiern.* Quite glabrous, glossy. Branches terete. Leaves elliptical, slightly obovate, obtusely narrowed at the apex, wedge-shaped at the base, crowded at the ends of the shoots and branches, spreading, turning nearly black when dry, chartaceous, 1¼–4 by ⅝–2 in.; lateral veins about 6 pairs, inconspicuous; petiole ¼–½ in.; stipules broadly ovate, apiculate, ⅛–⅕ in. long. Flowers tetramerous, ⅞ in. long (exclusive of the style), on short ebracteolate pedicels in dense globose sessile terminal panicles of 2–3 in. diameter. Calyx ⅓ in. long; lobes lanceolate, acute, ⅙ in. long. Corolla-tube rather slender, ¾ in. long; lobes spreading, oval, apiculate, nearly ⅓ in. long. Anthers narrowly linear, rather shorter than the corolla-lobes, exserted, at length twisted; filaments short. Style exserted by 1 inch, undivided, slender, slightly thick towards the summit, glabrous.

Mozamb. Distr. Zanzibar, Sabaki River, *Kirk!*

9. **P. macrosepala,** *Hiern.* A small glabrous pallid shrub. Branches terete, towards the extremities compressed. Leaves oval, obtuse or apiculate or subcuspidate, more or less narrowed at the base, membranous, 2½–5 by 1¼–2¾ in.; lateral nerves about 5–6 pairs, slender; petiole ¾–1¼ in.; stipules broadly ovate, acuminate, connate at the base, ⅙–¼ in. long. Flowers tetramerous, 2 in. long (exclusive of the style), on rather slender ebracteolate pedicels of ½–¾ in., in lax sessile terminal panicles of about 6 in. diameter, and in smaller subterminal ones. Calyx ¾ in. long, turbinate; limb ⅔ in. long, foliaceous, glabrous on both sides or hispidulous outside; lobes 4, oval-lanceolate, acuminate, nearly ½ in. long, suberect. Corolla glabrous on both sides; tube slender; limb partite; segments 4, oval-oblong, subapiculate, spreading, ½ in. long. Anthers narrowly linear, nearly equalling the corolla-lobes, apiculate, exserted, at length twisted; filaments very short. Style glabrous, undivided, exserted by 1⅛ in., subclavate above.

Mozamb. Distr. Rovuma River, 10° S. Lat., *Kirk!*

10. **P. neurocarpa,** *Benth. in Hook. Niger Fl.* p. 414. A glabrous shrub. Branches spreading, compressed and sulcate towards the extremities. Leaves oval, caudate-acuminate, unequally narrowed and subobtuse at the base, glossy, firmly chartaceous, 6–9 by 2½–3½ in.; lateral veins about 10–12 pairs; petiole ⅔–1⅙ in.; stipules from a broad base, caducous. Fruit whitish, ⅓ in. diameter, obscurely 8-nerved, on bracteolate pedicels of 1⅙–⅙ in., several together, in subsessile terminal divaricately branched hemispherical panicles of 2–3 in. diameter; bracteoles ovate, the upper ones smaller and acute. Seeds ⅙ in. diameter, excavated on the ventral face; embryo small.

Upper Guinea. Fernando Po, *Th. Vogel!*

11. **P. subcana,** *Hiern.* A small closely branched rather hoary shrub. Branches ashy, glabrate. Leaves opposite, oval, rounded obtuse or retuse at the apex, wedge-shaped at the subsessile base, shortly and softly pubescent, submembranous, 1–2¼ by ⅖–⅘ in.; lateral veins about 4–5 pairs, very slender; stipules subulate from a truncate

base, caducous, small. Flowers tetramerous, $\frac{5}{6}$ in. long when expanded, exclusive of the style, on very short velvety pedicels, crowded many together, terminating short lateral naked branches. Calyx $\frac{1}{12}$ in. long, velvety outside, campanulate, ebracteolate; limb small, glabrous inside, 4-toothed; teeth deltoid, small. Corolla-tube slender, pubescent on both sides, slightly arching; lobes 4, oval, obtuse, $\frac{1}{5}$ in. long, minutely ciliolate, glabrate inside, spreading. Anthers $\frac{1}{4}$ in. long, apiculate, spreading; filaments short. Disk glabrous. Style exserted by $\frac{3}{4}$ in., glabrous except the puberulous narrowly fusiform obtuse undivided stigma.

Nile Land. Djur-land, *Schweinfurth!*

12. **P. gracilis,** *Klotzsch in Peters Mossamb. Bot.* p. 290 (1861). A small pallid bush. Branches rather slender, whitish, glabrate, terete except the extremities; young barren branches annulated. Leaves elliptical or slightly obovate, acuminate or subcuspidate, wedge-shaped at the base, membranous, glabrate or shortly pubescent especially beneath, crowded near the ends of the branches, rather paler beneath, 1–4½ by ¼–1¾ in.; lateral veins about 7–9 pairs, inconspicuous; petiole ⅛–¾ in.; stipules ovate or lanceolate, apiculate or acuminate, glabrate or pubescent, ⅛–¼ in. long. Flowers white, tetramerous, ½–¾ in. long, on short pubescent or nearly glabrous ebracteate pedicels in dense sessile terminal globose panicles of 2–3 in. diameter. Calyx-lobes lanceolate-subulate, acute, more or less hispidulous, ⅙–¼ in. long, persistent. Corolla-tube glabrous outside, sparingly pubescent inside, slender; lobes oval, apiculate, ⅙–⅕ in. long, spreading. Anthers linear, exserted, scarcely as long as the corolla-lobes, at length twisted, subsessile. Style glabrous, slender, exserted by ⅔–¾ in., undivided, slightly thicker towards the summit. Berry globose, ¼ in. diameter or rather more.—*P. incana*, Klotzsch l. c. p. 289, is a more pubescent form of the same species.

Mozamb. Distr. R. Sena, *Peters!* Shiramba, *Kirk!*; between Lupata and Tette, *Kirk!* Shigogo, *Kirk!* Manganja Mountains, *Kirk!* Foot of Moramballa, *Kirk!* Tette, *Peters!* (*P. incana*, Kl.).

Not the *Pavetta gracilis* of A. Richard (1830) nor that of Korthals (1851), neither of which may belong to *Pavetta*.

13. **P. abyssinica,** *Fresen. in Mus. Senck.* ii. 166 (1837). A shrub, about 5 feet high, with pale branches. Leaves opposite, elliptical, narrowed at both ends, chartaceous, glabrate above, pubescent beneath, 1½–5 by ¾–2½ in.; lateral veins about 10–12 pairs; petiole ⅙–½ in.; stipules subtruncate, sheathing, ¼–⅜ in. long. Flowers tetramerous, 1–1½ in. long, on short pedicels, crowded in dense terminal sessile clusters 2–4 in. diameter. Calyx ebracteolate, shortly pubescent or glabrate, ¼–⅓ in., deeply lobed, persistent, erect; lobes subulate, rather unequal, ⅛–⅙ in. long. Corolla-tube pubescent inside, glabrous outside or very nearly so, robust; lobes oval-oblong, mucronulate, ⅓–⅜ in. long. Anthers ¼–⅓ in. long, exserted; filaments short. Disk glabrous. Ovary campanulate, small; style exserted by ⅔–⅚ in., puberulous above, glabrous below, undivided; ovules pendulous, not immersed. Fruit

shining, nearly glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. diameter.—A. Rich. Fl. Abyss. i. 352, non Oliv. sub *Ixorâ*. *P. congesta*, Br. in Salt, Abyss. App. lxii. (name only).

Nile Land. Abyssinia, *Rüppell, Quartin-Dillon and Petit! Salt! Schimper! Roth!*

A. Richard, Fl. Abyss. i. 352, gives under this species two varieties, *α. cinerascens* with leaves and corolla-tube cinereo-hirsute, and *β. glabra* with branchlets leaves and corollas glabrous; but none of the specimens seen by me agree with either. Oliver's plant, collected by Grant, is now referred to a different species.

14. **P. Oliveriana,** *Hiern.* A shrub with pale tomentellous subterete erect-patent branchlets. Leaves oval, subacuminate, obtuse at the base, softly hairy, with short hairs on the upper surface, velvety beneath with short pale hairs, somewhat leathery to the touch (Grant), $1\frac{1}{4}$–4 by $\frac{2}{3}$–$2\frac{1}{6}$ in.; lateral veins about 8–11 pairs; petiole $\frac{1}{6}$–$\frac{1}{2}$ in.; stipules ovate, acuminate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, caducous. Flowers white, tetramerous, 1–$1\frac{1}{6}$ in. long, on short hairy pedicels, numerous, in dense sessile terminal hemispherical corymbs of about 5 in. diameter. Calyx hairy, $\frac{1}{4}$–$\frac{1}{3}$ in. long; limb erect, deeply lobed, lobes subulate, rather unequal, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Corolla pubescent outside; tube pubescent inside; lobes oval, mucronulate, $\frac{1}{5}$ in. long. Anthers $\frac{1}{6}$ in. long, exserted; filaments short. Disk glabrous. Ovary turbinate-campanulate, small; style exserted by $\frac{2}{3}$–$\frac{3}{4}$ in., glabrous below, puberulous above, undivided; ovule immersed in the pale fleshy placenta.—*Pavetta*, sp., T. Thoms. in Speke, Journ., App. p. 636. *Ixora abyssinica*, var., Oliv. in Trans. Linn. Soc. Lond. xxix. 87, non Fresen. sub *Pavettâ*.

Nile Land. Karagué, by water, *Speke and Grant!*

15. **P. mollis,** *Afzel. in herb., non Br.* A pale smooth plant. Branches erect-patent, whitish, terete, glabrescent, puberulous at the extremities. Leaves elliptical, narrowed at both ends or at least towards the base, softly tomentellous at least on the midrib and 8 pairs of lateral slender veins, $1\frac{1}{2}$–4 by $\frac{1}{2}$–$1\frac{3}{5}$ in.; petiole $\frac{1}{5}$–$\frac{2}{5}$ in.; stipules apiculate from a broad ovate or truncate base, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers tetramerous, on softly pubescent pedicels of $\frac{1}{8}$–$\frac{3}{8}$ in., many, in corymbs of 1–2 in. diameter, at the ends of naked shoots of the previous season. Calyx about $\frac{1}{6}$ in. long, pubescent, turbinate; limb 4-partite; segments subulate. Corolla (in bud) pubescent outside; lobes acuminate. Ovules solitary, immersed in the fleshy placentas.

Upper Guinea. *Hb. Afzelius!* Cape Coast, *Brass!*

P. subglabra, Schum. Beskr. Guin. Pl. p. 78, is unknown to me; but it may prove to be identical with this species; it came from Guinea, but no special locality is given, and the following characters may be added: leaves subciliate, not attenuate at the base, 2 in. long, corymb fastigiate, corolla-tube $\frac{1}{2}$ in. long, style $1\frac{1}{2}$ in.

16. **P. dolichosepala,** *Hiern.* A shrub, 6 feet high. Branchlets terete, pale, smooth, glabrate, green and puberulous at the extremities. Leaves opposite, elliptical or somewhat obovate, subacuminate, wedge-shaped at the base, membranous, glabrate above, puberulous and rather paler beneath, 4–7 by $1\frac{1}{2}$–$3\frac{3}{4}$ in.; lateral veins about 6–8 pairs, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., puberulous; stipules ovate, apiculate or obtuse, connate at the base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers tetramerous, 1 in. long

when expanded exclusive of the style, subsessile or very shortly pedicellate, many together in globose terminal sessile clusters; bracteoles below the pedicels. Calyx turbinate, glabrous, nearly $\frac{1}{2}$ in. long; limb $\frac{2}{5}$ in. long; lobes $\frac{1}{3}$ in. long, filiform-subulate from an ovate base. Corolla glabrous outside; tube thinly pubescent inside from the mouth half way down; lobes oval, mucronate, $\frac{5}{16}$ in. long. Anthers $\frac{1}{5}$ in. long, exserted; filaments compressed horizontally, lanceolate, $\frac{1}{12}$ in. long, recurved. Disk glabrous, annular, fleshy. Style exserted by $1\frac{1}{2}$–2 in., glabrous except the narrowly fusiform obtuse undivided puberulous stigma.

Lower Guinea. Loango, *Soyaux!*

17. **P. hispida,** *Hiern.* A shrub, 6–8 feet high, hispid on the branches, petioles, leaves, calyces, etc., with dull-tawny hairs. Leaves elliptical or somewhat obovate, acuminate or cuspidate, wedge-shaped at the base, with scattered short hispid hairs above, more densely hispid beneath especially on the midrib and on the 13–15 pairs of lateral veins, chartaceous, 5–11 by $1\frac{2}{3}$–$3\frac{2}{3}$ in.; petiole $\frac{1}{3}$–1 in. Flowers tetramerous, $\frac{3}{4}$–$\frac{5}{6}$ in. long when expanded exclusive of the style, on short hispid bracteolate pedicels, in rather dense sessile terminal subglobose branched cymes of about 5 in. diameter, bracteoles linear-subulate, like the calyx-lobes. Calyx nearly the length of the corolla-tube, green, deeply lobed; lobes erect. Corolla glabrous throughout, membranous, white; lobes $\frac{2}{3}$ in. long, ovate-oblong, apiculate, spreading, equalling the tube. Anthers scarcely $\frac{1}{2}$ in. long; filaments $\frac{1}{5}$ in. long. Disk glabrous. Ovary short, turbinate, 2-celled; style exserted by $1\frac{1}{2}$ in., glabrous, rather tapering upwards, undivided; ovules solitary, immersed in the fleshy placentas. Fruit nearly $\frac{1}{2}$ in. diameter; endocarp papery; seed $\frac{1}{3}$ in. diameter.

Upper Guinea. Fernando Po, *Mann!*

18. **P. genipæfolia,** *Schum. Beskr. Guin. Pl.* p. 78 (1827), *non Benth.* Branchlets terete, hollow, hispid-pubescent, at length glabrate. Leaves elliptical, acuminate, obliquely attenuate at the base, chartaceous, rather shining and at first hirsute-pubescent, at length glabrate and subscabrous above, hirsute especially on the veins beneath, 3–9 by 1–3 in.; lateral veins about 7–9 pairs; petiole $\frac{1}{3}$–1 in., subterete, hirsute; stipules connate below, pubescent, terminating in a long setaceous acumen, altogether $\frac{3}{8}$–$\frac{5}{8}$ in. long. Flowers tetramerous, $\frac{2}{3}$ in. long when expanded exclusive of the style, on short hirsute pedicels which are ebracteolate except the base, many together in dense abbreviated bracteate and bracteolate sessile or subsessile globose panicles of 2–4 in. diameter. Calyx when straightened $\frac{5}{8}$ in. long, hirsute outside; limb foliaceous, $\frac{1}{2}$ in. long, deeply 4-lobed, persistent; segments obovate-oblong, obtuse, venose, somewhat hirsute inside. Corolla glabrous on both sides; tube slender, rather arching; lobes oval-oblong, scarcely $\frac{1}{2}$ in. long, subapiculate, spreading. Anthers $\frac{1}{4}$–$\frac{1}{3}$ in. long, apiculate, spreading; filaments $\frac{1}{8}$ in. long, compressed, linear. Disk glabrous. Ovules oblong. Style exserted by $1\frac{1}{4}$ in., quite glabrous, undivided, scarcely thickened towards the tip. Fruit globose, rather shining,

scattered with hirsute hairs, $\frac{1}{3}$ in. diameter, 2-sulcate, 2-celled, 2-seeded, crowned by the persistent calyx-limb.

Upper Guinea. Sierra Leone, *Afzelius ! Barter !* (in flower bud).

19. **P. Baconia,** *Hiern.* A shrub from 3–4 to 15–20 feet high or a small tree, puberulous or glabrate, shining. Branches subterete, towards the extremities angular and somewhat compressed. Leaves elliptical, narrowed at both ends, more or less acuminate, firmly chartaceous, 3–8 by 1–$3\frac{1}{2}$ in.; lateral veins about 6–8 pairs; petiole $\frac{1}{4}$–1 in. or less; stipules much apiculate from a broad sheathing base, $\frac{1}{5}$–$\frac{1}{3}$ in. long. Flowers tetramerous, $\frac{3}{16}$ in. long, ebracteolate, on short puberulous pedicels, many together, in dense terminal corymbs of 2–3 in. diameter with a pair of leaves or foliaceous bracts at the base. Calyx campanulate, green, ebracteolate, puberulous or pubescent, $\frac{1}{8}$ in. long; limb unequally 4-cleft; lobes rounded or obtuse, more or less imbricated at least in the bud. Corolla white; tube very short, glabrous outside; throat bearded; lobes 4, $\frac{1}{4}$ in. long, oval, glabrous, spreading. Anthers nearly equalling the corolla-lobes; filaments short, compressed. Disk glabrous. Ovary short, 2- or rarely 4-celled; ovules solitary, immersed in the fleshy placentas. Style exserted by $\frac{1}{4}$ in., shortly pubescent above, usually undivided. Fruit 2-sulcate, 2-celled, 2-seeded, glabrate, $\frac{1}{5}$–$\frac{1}{4}$ in. long. —*Baconia corymbosa,* DC. in Ann. Mus. Par. ix. 220 (1807); Benth. in Hook. Niger Fl. 413. *Verulamia corymbosa,* DC. in Lam. Encycl. Méth. viii. 543 (1808). *Ixora nitida,* Schum. et Thonn. Beskr. Guin. Pl. p. 77. *P. genipæfolia,* Benth. in Hook. Niger Fl. 415, non Schum.

A very variable plant; the varieties given below, or some of them, may prove distinct species. The original specific name *corymbosa* is ineligible under *Pavetta*, as *P. corymbosa,* Houtt. is the oldest name of a Cape species of *Pavetta.*

Upper Guinea. Widely diffused. Occurs also in Fernando Po, *Mann!*
Lower Guinea. Congo, *Chr. Smith !*

Var. β. *angustifolia,* DC. Prodr. iv. p. 485. Leaves glabrate, narrower, more acuminate at both ends.

Upper Guinea. Senegambia, *Perrottet and Leprieur, Heudelot !*

Var. γ. *oblongifolia.* Leaves oblong, $4\frac{1}{2}$ by 1 in., glabrate, obtuse, narrowed to a subsessile base.

Baconia, sp. nov., Benth. in Hook. Niger Fl. p. 413.

Upper Guinea. Senegambia, *Heudelot !*

Var. δ. *tomentella.* Branches shortly tawny-velvety. Leaves elliptical, puberulous beneath, subobtuse, nearly rounded at the subsessile base, 2–6 by $\frac{1}{2}$–$2\frac{3}{4}$ in. Corolla-lobes $\frac{3}{8}$ in. long.

Nile Land. Djur-land and Bongo-land, *Schweinfurth !*

Var. ε. *nigrescens.* Glabrate, turning black in drying. Leaves elliptical, narrowed at both ends, petiolate. Corolla-lobes $\frac{1}{4}$ in.

Lower Guinea. Annobon Island, *Burton !*

20. **P. Hookeriana,** *Hiern.* A shrub 6–8 feet high, glabrous except the inflorescence, &c., shining. Branches subterete, somewhat compressed towards the extremities. Leaves opposite, elliptical, acute or acuminate, wedge-shaped at the base, chartaceous, of a yellowish green colour on both sides when dry, 2–6 by $\frac{3}{4}$–2 in.; lateral veins about 8–10 pairs, clearly marked beneath, usually with slightly hairy

little pits in the axils; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules apiculate from a broad subtruncate base, $\frac{1}{5}$–$\frac{1}{4}$ in. long, covering a ring of caducous hairs. Flowers tetramerous, $\frac{1}{4}$ in. long when expanded, exclusive of the style, on rather shorter puberulous pedicels, many together. in crowded terminal sessile corymbs of about 2 in. diameter. Calyx $\frac{1}{8}$–$\frac{1}{6}$ in. long, puberulous outside, ebracteolate; limb unequally 4-lobed; lobes oval, rounded or obtuse, $\frac{1}{12}$–$\frac{1}{10}$ in. long, recurving, deciduous. Corolla glabrous except the bearded throat; lobes 4, reflexed, ovate-oblong, subobtuse, nearly $\frac{1}{4}$ in. long. Anthers $\frac{1}{5}$ in. long, reflexed, apiculate; filaments rather short, recurving. Disk hispidulous, cushion-shaped. Ovary short. Style exserted by $\frac{1}{4}$ in., puberulous above, undivided. Fruit $\frac{1}{4}$–$\frac{1}{3}$ in. diameter; seeds $\frac{1}{5}$ in. diameter, excavated on the inner face. —*Baconia montana*, Hook. f. in Journ. Linn. Soc. Lond. vii. p. 196.

Upper Guinea. Cameroon Mountains, 7000 feet, *Mann!*

21. **P. ternifolia,** *Hook. f. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. 86, t. 51, *sub* Ixorâ. A nearly glabrous shrub, apparently evergreen; stem erect; branches ternate angular. Leaves ternate, elliptical, subacuminate, wedge-shaped at the subsessile base, chartaceous, glossy above, concave beneath, glabrous except little hairy depressions in the axils of the 6–7 pairs of lateral veins beneath, 2–4 by $\frac{1}{2}$–1 in.; stipules abruptly subulate from a broad subtruncate base, keeled, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers tetramerous or occasionally pentamerous, jasmine-scented, $\frac{1}{4}$ in. long, on rather shorter puberulous pedicels, numerous, in dense sessile corymbs of 1–2 in. diameter. Calyx $\frac{1}{6}$ in. long, campanulate-turbinate, puberulous outside; lobes rounded, imbricated or occasionally contorted in the same direction as the corolla, $\frac{1}{12}$ in. long. Corolla white, glabrous except the bearded throat; lobes reflexed, ovate-oblong, $\frac{1}{4}$ in. long or rather more. Anthers $\frac{1}{5}$ in. long; filaments rather short. Disk cushion-shaped, glabrous. Ovary short. Style exserted by $\frac{1}{3}$ in., undivided, glabrous. Ovules solitary, immersed in the fleshy placentas.—*Stylocoryne*, sp., T. Thoms. in Speke, Journ., App. p. 636.

Nile Land. Karagué, by water, *Speke and Grant!*

22. **P. gardeniæfolia,** *Hochst. in Hb. Schimp. Abyss.* ii. *n.* 1141 (1842). A small shrub or ranging up to 10 feet, nearly glabrous. Branches opposite, pale, subterete, erect-patent, leafy at the extremities. Leaves narrowly elliptical or somewhat obovate, more or less pointed at the apex, wedge-shaped at the shortly petiolate or subsessile base, firmly chartaceous, often marked with immersed glands, 1–3½ by $\frac{1}{4}$–1 in.; lateral veins about 6 pairs, very slender, inconspicuous; stipules broadly ovate, apiculate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, covering caducous hairs. Flowers tetramerous, white, $\frac{1}{4}$–$\frac{3}{8}$ in. long, on short glabrous rather slender pedicels, several together, in short, lateral and subterminal, shortly pedunculate subfasciculate often drooping corymbs of $\frac{1}{2}$–1½ in. long. Calyx glabrous, turbinate-campanulate, ebracteolate, $\frac{1}{16}$ in. long; limb shortly 4-cleft, teeth obtuse, broad. Corolla glabrous outside, puberulous inside the throat; lobes about equalling the tube, oval, obtuse. Anthers nearly as long as the corolla-lobe; fila-

ments short. Disk glabrous. Ovary short. Style exserted by $\frac{3}{8}$–$\frac{1}{2}$ in., glabrous, fusiform above, undivided. Ovules solitary, immersed in the fleshy placentas. Fruit $\frac{1}{4}$ in. diam., shining.—A. Rich. Fl. Abyss. i. p. 351. *P. longiflora*, Hochst. in Hb. Schimp. Abyss. i. n. 210, non Vahl; *P. reflexa*, Br. in Salt, Abyss. App. p. lxii., name only (1814), (*Salt!* flowers reflexed, $\frac{1}{2}$ in. long).

Nile Land. Abyssinia, *Schimper! Q. Dillon et Petit!* Capt. *Pullen!*

α. *longiflora*, Vatke in Oesterr. Bot. Zeitschr. 1875, p. 231.

Flowers ranging up to $1\frac{1}{6}$ in., white, subsessile. Stipules much apiculate. Style exserted by $\frac{1}{8}$ in.

Nile Land. Abyssinia, at 5000 ft. alt., August, 1872, *Hildebrandt*, 496; 1870, *Beccari*, 148.

β. *breviflora*, Vatke in Oesterr. Bot. Zeitschr. 1875, p. 231.

Flowers yellowish, $\frac{2}{5}$ in. long.

Nile Land. Somali, *Hildebrandt!* Abyssinia, *Hildebrandt!*

23. **P. canescens,** *DC. Prodr.* iv. 492, *ex descriptione.* A shrub, about 4 feet high, with cinereous terete erect-patent glabrescent branches. Leaves obovate-oval, rounded retuse or shortly pointed at the apex, wedge-shaped at the base, subchartaceous, somewhat hairy above, hoary-velvety beneath, deciduous, $1\frac{1}{2}$–$2\frac{1}{2}$ by 1–$1\frac{5}{8}$ in.; lateral veins about 10 pairs; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules ovate, acuminate, connate at the base, $\frac{1}{6}$–$\frac{1}{5}$ in. long. Flowers tetramerous, white, $\frac{3}{8}$ in. long when expanded exclusive of the style, on short shortly pubescent (hirsute, DC.) pedicels, numerous, in dense globose subsessile clusters lateral on leafless portions of the branches. Calyx ebracteolate, $\frac{1}{8}$ in. long, shortly hairy (hirsute, DC.); limb shortly toothed, teeth keeled, subapiculate. Corolla glabrous outside or very nearly so; tube pubescent inside; lobes oval, mucronulate, $\frac{1}{8}$ in. long, very thinly puberulous inside. Anthers nearly equalling the corolla-lobes, filaments short. Disk glabrous. Ovary campanulate, small; style exserted by nearly $\frac{1}{2}$ in., glabrous below, puberulous and subclavate above, bifid at the tip. Ovules shortly sunk at the apex in the placenta.—*P. tomentosa*, A. Rich. in Mém. Soc. Hist. Nat. Par. v. p. 181, non Roxb.

Lower Guinea. Angola, at Ambriz, *Monteiro!*

24. **P. rigida,** *Hiern.* A rigid nearly glabrous pallid shrub, 10–12 feet high. Branches subterete, somewhat compressed towards the extremities. Leaves elliptical, subacuminate, obliquely narrowed at the base, glabrous, chartaceous, 6–9 by $2\frac{2}{3}$–$3\frac{1}{3}$ in.; lateral veins about 10–12 pairs, slender; petiole $\frac{1}{2}$–1 in.; stipules broadly ovate, apiculate, about $\frac{3}{8}$ in. long, deciduous. Flower $\frac{2}{3}$ in. long, tetramerous, on rigid puberulous pedicels of $\frac{1}{12}$–$\frac{3}{8}$ in., numerous, in somewhat lax axillary rigid pedunculate ascending bracteolate corymbs of 5–6 in. diam.; common peduncle equalling or rather exceeding the leaves; bracteoles subulate, small. Calyx green, $\frac{1}{8}$ in long, turbinate, obsoletely puberulous; limb $\frac{1}{12}$ in. long, shortly 4-lobed or sinuate-truncate. Corolla glabrous except the pubescent interior of the tube from the mouth part of the way downwards, white; lobes oval, $\frac{3}{8}$ in. long, obtuse, spreading. Anthers reflexed, shorter than the corolla-lobes, twice the length of the filaments. Disk glabrous. Ovary small. Style exserted by $1\frac{5}{8}$ in.,

glabrous except the puberulous subfusiform retuse stigma. Ovules solitary, immersed in the fleshy placentas.

Upper Guinea. Fernando Po, *Mann!*

25. **P. gracilipes,** *Hiern.* A small pallid nearly glabrous glossy shrub. Branches smooth glabrous, obtusely angular, compressed towards the extremities. Leaves oblanceolate, acuminate, attenuate at the base, membranous, glabrous, 10–13½ by 3½–4½ in.; lateral veins about 12–16 pairs, slender, inconspicuous; petiole 1–2 in.; stipules caudate-apiculate from a broad ovate connate base, ½–⅝ in. long. Flowers numerous, ⅜–½ in. long, tetramerous, on slender puberulous pedicels of ⅕–⅖ in., in axillary bracteolate pedunculate subglobose rather lax pendulous corymbs of 4–6 in. diam.; common peduncle slender, glabrous, drooping, about equalling the leaves; bracteoles small and subulate, sometimes with one or two linear or narrowly elliptical bracts of 1½–2 in. long. Calyx 1/10–⅛ in. long, obsoletely puberulous; limb hemispherical, 4-cleft, lobes rounded or obtuse. Corolla glabrous except the pubescent interior of the tube from the mouth part of the way down; lobes elliptical or ovate-oval, about ⅜ in. long, obtuse. Anthers ⅕ in. long; filaments 1/10 in. Disk glabrous. Ovary small. Style exserted by ¾–⅚ in., glabrous except the minutely puberulous subfusiform undivided stigma. Ovules solitary, immersed in the fleshy placentas.

Upper Guinea. River Gaboon, *Mann!*

EXCLUDED SPECIES.

P. latiflora. *G. Don, Gen. Syst.* iii. p. 575, is *Memecylon Donianum*, Planch.; Oliv. Fl. Trop. Afr. ii. p. 463.

57. COFFEA, Linn.; Benth. et Hook f. Gen. Pl. ii. p. 114.

Calyx-tube short, campanulate turbinate or urceolate; limb small or obsolete, cleft or obscurely toothed, persistent, not accrescent. Corolla salver- or somewhat funnel-shaped, membranous or slightly coriaceous; tube short or elongated; throat glabrous; limb spreading, 5–7-partite, rarely 4- or 8-partite, lobes contorted dextrorsely (as seen from inside) in æstivation. Stamens 5–7, rarely 4 or 8, inserted at the mouth of the corolla, exserted or partly included, glabrous; filaments short or obsolete or even two-thirds of the length of the anthers; anthers linear, fixed at the back above the base. Disk fleshy, glabrous. Ovary 2-celled; style filiform, glabrous, usually shortly exserted, bifid; lobes linear spathulate or tapering; ovules solitary, subpeltately attached about the middle of the ovary or rather lower, amphitropous. Berry (in our species) ellipsoidal oblong or subglobose, more or less fleshy; pyrenes 2 (one sometimes abortive), papery or coriaceous, convex on the back, flat with a narrow usually deep longitudinal furrow on the face. Seeds plano-convex; umbilicus ventral; testa membranous, intruded within the furrow of the face; embryo somewhat curved; cotyledons foliaceous; radicle subterete, inferior, longer than the

cotyledons; albumen horny.—Shrubs or small trees with opposite branches and leaves, ovate or lanceolate apiculate intrapetiolar stipules, axillary or terminal solitary or clustered white fragrant hermaphrodite flowers, and bracteoles usually connate into a single or double cup at the base of the calyx or on the short pedicels or peduncle.

A genus of about 25 species, confined to the warmer parts of the old world; cultivated elsewhere.

Glabrous, mostly evergreen. Flowers axillary.
Calyx-limb very small, annular or denticulate.
Anthers wholly exserted.
Bracteoles obtuse or apiculate, not lanceolate-acute, falling short of the calyx-limb. Flowers clustered, rarely solitary.
Corolla pentamerous . . . . . 1. *C. arabica.*
Corolla 6–8-merous.
Berry terete, not longitudinally nerved. Leaves subcoriaceous.
Flowers many together. Leaves shortly acuminate, ranging up to 1 foot . . . . 2. *C. liberica.*
Flowers 3–1 together. Leaves caudate-acuminate, ranging under 6 inches . . . 3. *C. stenophylla.*
Berry longitudinally nerved. Leaves chartaceous . . . . . 4. *C. Zanguebariæ.*
Bracteoles in pairs lanceolate-acute and deltoid-apiculate, exceeding the calyx. Flowers solitary 5. *C. brevipes.*
Anthers at least half included within the corolla-tube 6. *C. melanocarpa.*
Calyx-limb broad, with 5 rounded lobes.
Stipules lanceolate-subulate. Bracteoles small, not foliaceous.
Berry subglobose, solitary or subgeminate. Leaves 3–9 by $1\frac{1}{4}$–$3\frac{1}{2}$ in. . . . . 7. *C. hypoglauca.*
Berry ellipsoidal. Flowers fasciculate in the axils along the branchlets. Leaves $2\frac{1}{2}$ by $\frac{2}{3}$–$\frac{3}{4}$ in. . . 8. *C. ? microcarpa.*
Stipules apiculate from a broad ovate base. Bracteoles foliaceous . . . . . 9. *C. Afzelii.*
Not quite glabrous. Leaves mostly deciduous. Flowers terminal and axillary or lateral or terminating short lateral branches.
Leaves oval, puberulous or glabrous.
Anthers wholly exserted. Flowers in company with the leaves . . . . . 10. *C. subcordata.*
Anthers almost wholly included. Flowers precocious.
Bracteoles herbaceous. Calyx-limb truncate or denticulate. Corolla 5-lobed . . . . . 11. *C. rupestris.*
Bracteoles glumaceous. Calyx-limb with rounded lobes. Corolla usually 7–6-lobed . . . . . 12. *C. jasminoides.*
Leaves ovate-lanceolate, scabrid . . . . . 13. *C. racemosa.*

1. **C. arabica,** *Linn. Sp. Pl.* p. 172 (1753). A glabrous glossy shrub or small tree. Branches terete or at the extremities rather compressed. Leaves oval or elliptical, acuminate, wedge-shaped at the base, subcoriaceous, evergreen (usually persisting for three years), somewhat undulated, 3–8 by $1\frac{1}{4}$–3 in.; lateral veins 7–12 pairs; margins rather undulated; petiole $\frac{1}{6}$–$\frac{1}{2}$ in.; stipules broadly ovate, apiculate, connate at the base, $\frac{1}{6}$–$\frac{1}{4}$ in. Flowers fragrant, $\frac{1}{2}$–$\frac{3}{4}$ in. long just

before expansion, about half as long after expansion, subsessile or very shortly pedicellate, 2–9 or more together in very short axillary or lateral bracteolate clusters; bracteoles ovate, the inner ones connate at the base of the pedicels, falling short of the shallow subtruncate or obtusely 5-denticulate calyx-limb. Corolla white; lobes oval, obtuse or mucronulate, equalling or exceeding the tube, spreading. Anthers rather shorter than the corolla-lobes, wholly exserted, fixed rather below the middle to the filaments, which are about half as long. Disk glabrous. Style about equalling the unexpanded flower, bifid; lobes linear, narrower towards the tip. Berry ellipsoidal, $\frac{3}{8}$–$\frac{1}{2}$ in. long, at first green, then red, and at length blue-black. Seeds from $\frac{1}{3}$ to nearly $\frac{1}{2}$ in. long.—*C. laurifolia*, Salisb. Prodr. Stirp. Hort. Chapel Allert. p. 62 (1796), non H. B. et K.

Upper Guinea. Fernando Po, *Barter!* (*cultivated*).

Nile Land. Abyssinia, spontaneous and cultivated, *Schimper! Q. Dillon et Petit! Ferret et Galinier;* Karagué, a market produce, and Victoria Nyanza, *Speke and Grant.*

Lower Guinea. Angola, teste *Welwitsch!* Apontamentos, p. 549 (1859), in Golung Alto, indigenous and cultivated.

Mozamb. Distr. Mozambique coast especially opposite the Querimba Islands, wild and cultivated, *Peters, fide* Klotsch in Peters Mossamb. 291.

Cultivated also in Arabia (where it is said to be indigenous), in Natal, and throughout tropical India and America. It is probable that it is a true native of Abyssinia.

Var. *leucocarpa, Hiern in Trans. Linn. Soc. Lond.*, Ser. ii., i. p. 171. A glabrous shrub. Branches terete, somewhat compressed towards the extremities. Leaves elliptic-oblong, obtusely acuminate, wedge-shaped at the base, thinly coriaceous, 3–6 by 1–2 in.; lateral veins about 6–7 pairs, inconspicuous, not glandular in the axils; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules sheathing at the base, subtruncate, subapiculate, $\frac{1}{8}$ in. long. Flowers few together in short axillary clusters. Bracteoles ovate, falling short of the fruiting pedicel by about $\frac{1}{12}$–$\frac{1}{8}$ in. Berries white, solitary or 2 together, roundly spheroidal, $\frac{3}{8}$ long, smooth. Seeds $\frac{1}{4}$ in. long.

Upper Guinea. Sierra Leone, *Th. Vogel!*

2. **C. liberica,** *Bull ex Hiern in Trans. Linn. Soc. Lond.*, ser. ii., i. p. 171, t. 24. A glabrous glossy shrub. Branches smooth, spreading, subterete, somewhat compressed towards the extremities. Leaves elliptic-obovate, shortly acuminate, wedge-shaped or obtusely narrowed at the base, somewhat undulated, thinly coriaceous, 4½–6–12 by 1½–2–4¾ in.; lateral veins about 8–12 pairs, with glands in the axils opening by a small hole beneath; petiole $\frac{3}{8}$–$\frac{5}{8}$ in. long; stipules broadly ovate, apiculate, connate at the base, shorter than the petiole, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers 7–6-merous, subsessile, several together, clustered, axillary, 1 in. long when expanded; bracteoles connate, calyculate, depresso-deltoid, subtruncate, all shorter than the subtruncate calyx; sometimes one oval bracteole is produced above the others. Calyx-limb annular, very short. Corolla-lobes 7–6, oval, obtuse, about as long as the tube, spreading. Anthers 7–6, wholly exserted, $\frac{1}{2}$ in. long; filaments $\frac{1}{4}$ in. Berry oval, $\frac{3}{4}$ in. long or rather more, black when ripe. Seed $\frac{1}{2}$ in. or rather more. Style exserted, bifid.—*C. arabica*, Benth. in Hook. Niger Fl. 413 (*part.*), non Linn.

Upper Guinea. Sierra Leone, *Afzelius!* Monrovia (native) and Cape Palmas (cultivated, July, 1841), *Th. Vogel! Daniell!* (Sierra Leone, cultivated).

Lower Guinea. Golungo Alto, *Welwitsch!* Cazengo, *Welwitsch!* indigenous (in young fruit).

The source of the Liberian coffee, and probably also of the Cape-Coast coffee; it is said to be far superior to *C. arabica*, Linn., having larger berries and a finer flavour, and being at the same time more robust and productive.

3. **C. stenophylla,** *G. Don, Gen. Syst.* iii. p. 581. A small tree of 20 feet or a shrub of 4–6 feet, glabrous, glossy. Stem about 10 feet high, 13 in. diam. near the base; bark smooth, grey. Branches slender, terete, compressed towards the extremities, the lower ones irregularly scattered, the upper ones opposite, brachiate, leafy. Leaves elliptic-oblong or obovate, caudate-acuminate, wedge-shaped at the base, subcoriaceous, somewhat undulated, $1\frac{1}{2}$–$5\frac{1}{4}$ by $\frac{1}{5}$–$1\frac{1}{3}$ in.; lateral veins about 7–9 pairs, inconspicuous above, marked beneath with small punctured glands in the axils; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. long; stipules apiculate from broad ovate or subtruncate connate base, about equalling the petiole. Flowers $\frac{5}{8}$–$\frac{7}{8}$ in. long just before expansion, $\frac{1}{3}$–$\frac{3}{8}$ in. after expansion, 3–1 together, subsessile, in axillary clusters; bracteoles ovate or lanceolate-oblong, the upper ones connate below and rather exceeding the small pale green subentire calyx-limb which just exceeds the disk. Corolla-tube $\frac{1}{4}$ in. long; lobes 6–8, oval or oblong, obtuse, $\frac{5}{16}$–$\frac{5}{8}$ in. long, spreading. Anthers wholly exserted, fixed at $\frac{1}{3}$rd above the base, three times the length of the filaments, $\frac{1}{4}$–$\frac{3}{8}$ in. long. Style nearly equalling the unexpanded flower, bifid; lobes narrowly linear. Berry prolate-spheroidal, $\frac{1}{2}$ in. long, black when ripe, shortly pedicelled. Seed $\frac{1}{3}$ in. long.—*C. arabica*, Benth. in Hook. Niger Fl. 413 (*part.*), non Linn.

Upper Guinea. Sierra Leone, *Afzelius! Morson! G. Don! Barter!* The highland coffee of Sierra Leone (*Dr. Daniell*).

4. **C. Zanguebariæ,** *Lour. Fl. Cochinch.* p. 145 (1790). A glabrous erect closely branched small tree, 6 feet high. Branches cinereous, rather thick, short, subterete, the young ones compressed. Leaves oval or obovate, obtuse or shortly pointed, wedge-shaped at the base, chartaceous, 2–4 by $\frac{3}{4}$–$2\frac{1}{4}$ in.; lateral veins about 5–6 pairs, with little hairy tufts in the axils; petiole $\frac{1}{12}$–$\frac{1}{4}$ in.; stipules ovate apiculate connate at the base, $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers white, axillary, many together, hexamerous or heptamerous, shortly pedicellate, clustered; bracteoles deltoid or subtruncate, apiculate, all falling short of the minute calyx-limb. Corolla-lobes 6–7. Berry red, turning black, oblong, longitudinally nerved, $\frac{1}{2}$–$\frac{3}{5}$ in. long.—*Amajoua africana*, Spreng. Syst. Veg. ii. 126.

Mozamb. Distr. Zanzibar coast (in woods, native), *Loureiro;* Mozambique, *Forbes! Loureiro* (cultivated).

5. **C. brevipes,** *Hiern in Trans. Linn. Soc. Lond.*, ser. ii., i. p. 172. A glabrous glossy shrub, 4–6 feet high. Branches slender, smooth, terete, somewhat compressed at the extremities. Leaves elliptic-obovate, acuminate, wedge-shaped at the base, firmly chartaceous, 4–$8\frac{1}{2}$ by $1\frac{1}{2}$–$2\frac{3}{4}$ in.; lateral veins about 6–8 pairs; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.; stipules ovate, apiculate, connate at the base, exceeding the petioles, $\frac{1}{5}$–$\frac{2}{5}$ in. long. Flowers solitary, subsessile, axillary, $\frac{1}{2}$–$\frac{5}{8}$ in. long

just before expansion, $\frac{1}{5}$–$\frac{1}{4}$ in. long when expanded; bracteoles 4, in 2 pairs, one pair deltoid-apiculate, the other pair longer, outer lanceolate, all connate at the base into a tube nearly equalling the ovary, the free parts much exceeding the obsolete calyx-limb. Corolla lobes 5–6, oval or oblong, $\frac{3}{8}$–$\frac{2}{5}$ in. long. Stamens 5–6; anthers wholly exserted, $\frac{1}{5}$–$\frac{1}{4}$ in. long, fixed at the back rather below the middle, about twice the length of the filaments. Fruit ellipsoidal, smooth, $\frac{1}{2}$ in. long, 2-celled, 2-seeded. Seeds $\frac{2}{5}$ in. long, smelling of coffee.

Upper Guinea. Cameroon Mountains, at 2–3,000 ft. alt., *Mann!*

6. **C. melanocarpa,** *Welw. ex Hiern in Trans. Linn. Soc. Lond.* ser. ii., i. p. 173. A glabrous shrub, 4–6 feet high, or sometimes a small tree of the same height. Branchlets slender, erect-patent; bark pale. Leaves opposite, oval, acuminate, usually wedge-shaped at the base, membranous, of the same colour on both surfaces, 2–6 by $\frac{3}{4}$–$2\frac{1}{4}$ in.; lateral veins about 4–5 pairs, slender, inconspicuous; petiole $\frac{1}{8}$–$\frac{3}{8}$ in.; stipules depresso-deltoid, very short, apiculate. Flowers few together or solitary, subsessile, axillary, sometimes also in the uppermost axils, in company with the leaves, about 1 in. long when expanded; bracteoles calyculate, falling short of the annular abbreviated denticulate calyx-limb; buds gummy. Corolla caducous; lobes 5, about $\frac{2}{3}$ in. long; throat bearded. Anthers nearly or wholly included. Style included. Berry subglobose, quite black, $\frac{1}{3}$–$\frac{3}{8}$ in. diam.

Lower Guinea. Golungo Alto, in dense woods, at St. de Bumba, near the Delamboa River, *Welwitsch!*

7. **C. hypoglauca,** *Welw. ex Hiern in Trans. Linn. Soc. Lond.* ser. ii., i. p. 173. A small glabrous tree, 8–20 feet high. Branches patent, from a straight erect trunk, forming a lax crown. Leaves opposite, oval or somewhat ovate, acuminate, rather wedge-shaped at the base, thinly coriaceous, shining, whitish or glaucescent beneath, 3–9 by 1–$3\frac{1}{2}$ in.; lateral veins about 4–6 pairs, rather slender; petiole $\frac{1}{8}$–$\frac{1}{2}$ in.; stipules lanceolate-subulate from a broad base, $\frac{1}{2}$–$\frac{3}{5}$ in. long. Flowers solitary or 2–3 together, subsessile; bracteoles imbricate, rounded, some apiculate. Berries solitary, subglobose, green when immature, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., crowned by the persistent 5-partite broadly imbricated calyx-limb. Calyx-lobes broad, rounded.

Lower Guinea. Pungo Andongo, in wooded places near Catete, and by the River Tangue, *Welwitsch!*

8. **C. ? microcarpa,** *DC. Prodr.* iv. p. 499 (1830), *non Ruiz et Pavon.* A shrub with glabrous branchlets. Leaves elliptic-oblong, shortly acuminate, $2\frac{1}{2}$ by $\frac{2}{3}$–$\frac{3}{4}$ in., glabrous; stipules acuminate-subulate, deciduous, undivided, solitary. Fruits ellipsoidal, 3 times the length of the pedicel, crowned by the cup-shaped 5-dentate calyx-limb.—*C. Perrottetii* (?), Steud. ex Buek, Index DC., pars i., præf. p. ix. (1842).

Upper Guinea. Senegambia, at Cape Rouge Casamancia, *Leprieur & Perrottet.*—I have seeen no specimen of this species.

9. **C. Afzelii,** *Hiern in Trans. Linn. Soc. Lond.* ser. ii., i. p. 174. Glabrous. Branches reddish, smooth, terete, at the extremities compressed. Leaves elliptical or somewhat ovate, obtusely acuminate, wedge-shaped at the base, chartaceous, $1\frac{1}{2}$–3 by $\frac{5}{8}$–$1\frac{1}{4}$ in.; lateral veins about 4–5 pairs, very slender; petioles ranging up to $\frac{1}{6}$ in. long; stipules apiculate from a broad base. Flowers pentamerous, 2 together, axillary, pedunculate, bracteolate; peduncle solitary, bearing near its base 4 small bracts consisting of 2 unequal pairs connate at the base into a calyculus and bearing at its apex 2 foliaceous large shortly stalked bracteoles at the base of the calyx. Calyx-limb short, wider than the ovary, 5-toothed. Corolla-lobes oval, obtuse. Anthers 5, inserted on the naked throat below the mouth of the corolla, sessile, fixed by the middle of the back. Style bidentate, glabrous.

Upper Guinea. Sierra Leone (flowers in bud, probably rather small), *Afzelius!* Seen only in very young flower in Afzelius' herbarium.

10. **C. subcordata,** *Hiern in Trans. Linn. Soc. Lond.*, ser. ii., i. p. 174. A shrub with slender terete hispidulous branches, hispid-pubescent at the extremities; branchlets patent. Leaves oval, obtusely acuminate, mucronulate, cordate rounded or somewhat hollowed at the base, firmly chartaceous, glabrescent above except the puberulous midrib, hispidulous beneath on the midrib and on the 4–5 pairs of lateral veins which have little hairy tufts in the axils, ranging up to $3\frac{1}{4}$ by $1\frac{1}{3}$ in.; petiole to $\frac{1}{5}$ in., hispid-pubescent; stipules caudate-apiculate from a short deltoid base, altogether $\frac{1}{6}$–$\frac{1}{5}$ in. long. Flowers $\frac{3}{4}$–$\frac{5}{6}$ in. long when expanded (4-)5–6 (–7)-merous, 1–2 together and axillary, also several together in abbreviated hemispherical cymes, subsessile or slightly pedicellate, fragrant. Calyx-limb about $\frac{1}{30}$ in. long, glabrous, cleft, invested by the double involucre; lobes rounded; each involucre composed of 2 pairs of opposite herbaceous bracteoles connate into a tube, hispidulous; outer involucre with 2 deltoid and 2 subulate lobes, nearly equalling the calyx (or sometimes with 1 pair foliaceous and exceeding the calyx); inner involucre with 2 oval cuspidate petiolate foliaceous lobes much exceeding the calyx and 2 depresso-deltoid apiculate lobes rather exceeding the calyx. Corolla pure white; lobes oval, obtuse, $\frac{1}{4}$ in. long. Anthers wholly exserted, $\frac{3}{16}$ in. long, fixed at the back $\frac{1}{3}$ above the base; filaments $\frac{1}{8}$ in. long. Berry red.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

11. **C. rupestris,** *Hiern in Trans. Linn. Soc. Lond.*, ser. ii., i. p. 174. A small deciduous nearly glabrous shrub. Branches terete, cinereous; young shoots puberulous. Leaves (young, 1 in. long) oval, somewhat narrowed at both ends; lateral veins about 4 pairs; petioles short; stipules ovate, apiculate, about equalling the petiole. Flowers precocious, 1 in. long just before expansion, $\frac{3}{5}$ in. long when expanded, white, fragrant, sessile, several together, clustered at the ends of the branches, terminal, pentamerous; bracts (young leaves ?) foliaceous, $\frac{1}{3}$ in. long, oval; bracteoles herbaceous, broadly ovate, apiculate, in 2 pairs; outer pair exceeding the ovary, inner pair small about equalling

the small subtruncate or denticulate not obsolete calyx-limb. Corolla-tube $\frac{1}{2}$ in. long; lobes oval, obtuse, $\frac{1}{2}$ in. long. Anthers 5 (or rarely 4?), sessile, inserted at the back at or rather above the middle, mostly included, $\frac{1}{6}$–$\frac{1}{5}$ in. long.

Upper Guinea. Abbeokuta, on rocks, *Barter!*

12. **C. jasminoides,** *Welw. ex Hiern in Trans. Linn. Soc. Lond.*, ser. ii., i. p. 175. A trailing, much branched, deciduous, undershrub of 2–5 feet. Branches terete, glabrescent, elongated, spreading; leafy shoots pubescent, short. Leaves oval, shortly pointed or acuminate, mucronulate, rounded at the base or nearly so, hispidulous with scattered short hairs especially on the margins and veins, chartaceous, sometimes subverticillate in fours by the approximation of the upper internodes, 1–3 by $\frac{2}{3}$–$1\frac{1}{2}$ in.; lateral veins about 5 pairs, slender; petiole $\frac{1}{12}$–$\frac{1}{6}$ in., pubescent; stipules ovate, acuminate-apiculate, imbricating, setaceus-apiculate, about $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowers precocious, white, outside often rose-red, ranging up to $1\frac{1}{2}$ in. long when expanded, fragrant, solitary or few together, lateral, terminating incipient lateral shoots, subsessile, heptamerous or hexamerous (rarely pentamerous?); bracteoles glumaceous, ovate or lanceolate, acutely acuminate, glabrous, exceeding the cleft calyx-limb; sometimes some of the inner bracteoles are subfoliaceous. Calyx-lobes rounded, usually 8–7; limb about $\frac{1}{15}$ in. long, glabrous. Corolla fugacious; tube slender, funnel-shaped above; limb $\frac{3}{4}$–1 in. diam., lobes $\frac{1}{3}$–$\frac{3}{8}$ in. long, oval. Anthers fixed by the middle, half included, subsessile, $\frac{1}{8}$ in. long. Style shortly exserted. Berry shortly ellipsoidal, $\frac{1}{3}$ in. long, white.

Upper Guinea. Niger Expedition, at Onitsha, *Barter!* Old Calabar, abundant, *Rev. W. C. Thomson!*

Lower Guinea. Angola, Golungo Alto, sparingly in very dense thickets near Camilungo at the base of Serra de Alto Queta, in flower at the end of October, 1855, *Welwitsch!* in dense woods, Serra de Alto Queta, in young fruit at the end of November, 1855, *Welwitsch!*

13. **C. racemosa,** *Lour. Fl. Cochin.* p. 145 (1790), *non Ruiz et Pavon* (1799.) A much-branched little tree, 4 feet high; branches diffuse, terete. Leaves opposite, ovate-lanceolate, scattered with numerous tubercles, scabrous; petioles short. Flowers subterminal; racemes erect, brachiate; common peduncle long, 4-sided, the partial ones shorter, terete, opposite or whorled. Berries subglobose, small, red, watery, 2-seeded; seeds hemispherical.—*C. ramosa,* Roem. et Schult. Syst. Veg. i. p. 198; *C. mozambicana,* DC. Prodr. iv. p. 500.

Mozamb. Distr. Mozambique Island, *Loureiro,* in young fruit from July to September.

I have seen no specimen of this species. The seeds are used for coffee.

58. **PSILANTHUS,** Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 115.

Calyx-tube short, turbinate or ovoid; limb shortly cup-shaped, dentate; teeth ovate, accrescent, at length elongated, persistent, subfoliaceous. Corolla salver-shaped, membranous; tube very slender, elongated; throat naked; limb spreading, 5–4-partite, segments oval

or oblong, contorted dextrorsely (as seen from inside) in æstivation. Stamens 5–4, inserted at the throat of the corolla, glabrous; filaments short or obsolete; anthers linear, included or partly so, fixed by the back, at or above the middle. Disk fleshy, glabrous. Ovary 2-celled; style slender, glabrous, bifid or bidentate, included, divisions linear or ovate; ovules solitary, "widely adnate to the middle of the septum, amphitropous" (Benth. et Hook. f. *l.c.*). Berry obovoid-oval, rather fleshy (in the typical species), crowned by the accrescent calyx-lobes; pyrenes 2. Seeds oblong; umbilicus ventral.—Glabrous shrubs, with opposite branches and leaves, short ovate stipules connate at the base, and solitary or subsolitary axillary or terminal subsessile white hermaphrodite flowers of moderate size, with or without calyculate bracteoles at the base.

An endemic genus.

Flowers axillary and terminal, pentamerous, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long. Anthers half-exserted.	1. *P. Mannii.*
Flowers terminal, pentamerous, 1 in. long. Anthers wholly included	2. *P.? ebracteolatus.*
Flowers terminal, tetramerous, $\frac{2}{3}$ in. long. Anthers wholly included	3. *P.? tetramerus.*

1. **P. Mannii,** *Hook. f. Ic. Pl.* t. 1129. A shrub, 10 feet high, shining. Leaves oval, obtusely and abruptly acuminate, rather oblique at the base, firmly chartaceous, 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in.; lateral veins about 6–8 pairs; petiole $\frac{1}{6}$–$\frac{1}{3}$ in.; stipules very short. Flowers $1\frac{3}{4}$–$2\frac{1}{2}$ in. long when expanded, axillary (and in the terminal axils) subsolitary, subsessile; bracteoles cup-shaped, surrounding the base of the calyx. Calyx green; limb shorter than the ovary in flower, accrescent; segments 5, ovate, in fruit lanceolate-oblong and $\frac{3}{8}$–$\frac{1}{2}$ in. long. Corolla white; tube very slender; limb 2–3 in. diameter; segments 5, oval. Anthers 5, $\frac{1}{6}$ in. long, sessile, half-exserted, fixed by the middle of the back. Style wholly included, slender, bifid; lobes linear. Fruit obovoid-oval, $\frac{2}{5}$–$\frac{3}{5}$ in. long, crowned by the persistent foliaceous calyx-segments.

Upper Guinea. Fernando Po, on the beach, *Mann!*

2. **P.? ebracteolatus,** *Hiern.* A shining shrub 6–8 feet high. Branches patent. Leaves elliptical, obtusely acuminate or obtuse, wedge-shaped at the base, membranous, $1\frac{1}{2}$–4 by $\frac{3}{5}$–$1\frac{1}{2}$ in.; lateral veins about 4–5 pairs, very slender, inconspicuous; petiole $\frac{1}{10}$–$\frac{1}{5}$ in.; stipules small, connate or more or less sheathing. Flowers 1 in. long, terminal, solitary, subsessile, ebracteolate. Calyx green; limb very shallowly cup-shaped, obscurely dentate, glabrous. Corolla white; tube slender, funnel-shaped above; limb $\frac{3}{4}$–1 in. diameter, lobes 5, ovate, subobtuse or mucronulate. Anthers wholly included, $\frac{1}{6}$ in. long, fixed at the back above the middle, just reaching the top of the corolla-tube; filaments short deflexed. Style included, bidentate or bifid. Ovules pendulous from the apex or (according to figure in the Kew herbarium) attached rather above the middle.

Upper Guinea. Bagroo River, *Mann!* Ambas Bay, *Mann!*

3. **P.? tetramerus,** *Hiern.* Glabrous. Branches opposite, terete except the extremities, subcinereous, erect-patent, approximated. Leaves elliptical or rather obovate, obtusely acuminate, attenuate to the very shortly petiolate base, firmly chartaceous, of nearly the same colour on the two surfaces, 1½–3 by ½–1 in.; lateral veins slender, inconspicuous, about 6–7 pairs, often with little glandular pits in the axils beneath; stipules shortly ovate, apiculate, pallid, deciduous. Flowers tetramerous, ⅔ in. long, sessile or subsessile in the uppermost axils of adult or young leaves, solitary or two together. Bracteoles absent from the base of the calyx. Calyx-limb short, truncate, crenulate, broader than the tube. Corolla salver-shaped; lobes 4, ovate-oblong, obtuse, ¼–⅓ in. long; throat glabrous. Anthers just included, linear, subsessile, ⅙–⅕ in. long; attachment rather above the middle of the back. Style ¼ in. long, nearly entire and glabrous.

Upper Guinea. Sierra Leone, *Afzelius!* seen from the Berlin herbarium, but not in that of Afzelius.

59. **RUTIDEA,** DC.; Benth. et Hook. f. Gen. Pl. ii. p. 116.

Calyx-tube ovoid or campanulate; limb 5–4-, rarely 6-lobed, deciduous; lobes ovate subulate or filiform. Corolla salver-shaped sometimes shortly so; tube cylindrical; throat glabrous; limb spreading or reflexed, deeply lobed, lobes 5–4 or rarely 6, oval, contorted dextrorsely (as seen from inside) in the bud. Stamens 5–4, rarely 6, inserted at the mouth of the corolla, exserted; filaments short; anthers oblong, apiculate, spreading, fixed at the back rather above the base. Disk fleshy, glabrous. Ovary 2- rarely 3-celled or incompletely so; style filiform, exserted, glabrous or nearly so; stigma fusiform clavate or globose, entire or rarely 2–3-lobed; ovules solitary, inserted on small fleshy placentas ascending from the base of the ovary, amphitropous, subreniform. Fruit somewhat fleshy, pea-shaped, 1-celled, 1-seeded; endocarp chartaceous. Seed globose, filling the cell; hilum basal; testa thin; albumen horny deeply ruminated; embryo terete, elongated, curved, cotyledons linear, radicle inferior. — Scandent shrubs with opposite patent branches, opposite leaves, apiculate entire or cleft stipules from a broad base, and rather small white bracteolate hermaphrodite flowers, capitate, arranged in brachiate terminal panicles or corymbose.

A genus containing one species from Madagascar and the following.

Stipules 3–5-cleft and—setose.
  Calyx-lobes subulate . . . . . 1. *R. rufipilis.*
  Calyx-lobes ovate . . . . . 2. *R. parviflora.*
Stipules apiculate, entire.
  Flowers pentamerous (rarely hexamerous).
    Corolla hairy outside.
      Branches shortly tomentose.
        Style glabrous. Leaves thinly coriaceous, beneath with conspicuous hairy tufts in the axils of the lateral veins . . . . . 3. *R. olenotricha.*
        Style thinly pubescent about the middle. Leaves

chartaceous without conspicuous hairy tufts in the axils	4. *R. ferruginea.*
Branches hispid	5. *R. hispida.*
Corolla glabrous on both sides or very nearly so.	
Leaves chartaceous, not abruptly acuminate . . .	6. *R. Smithii.*
Leaves thinly coriaceous, abruptly acuminate . . .	7. *R. decorticata.*
Flowers tetramerous (or by exception pentamerous).	
Stigma globose, 2–3-lobed	8. *R. membranacea.*
Stigma ovoid-clavate.	
Glabrous (except the inflorescence). Flowers $\frac{1}{2}$ in. long	9. *R. glabra.*
Hispidulous. Flowers $\frac{1}{3}$–$\frac{3}{8}$ in. long	10. *R. fuscescens.*

1. **R. rufipilis,** *Hiern.* A climbing shrub of 15 feet with pilose-hirsute branchlets; hairs rufous. Leaves ovate-oval, subacuminate, very acute, rounded at the base, chartaceous, ranging up to 4 by $1\frac{2}{3}$ in., glabrate above except the puberulous depressed midrib, pilose beneath at least on the 4–5 pairs of lateral veins; petiole ranging up to $\frac{1}{4}$ in., pilose-hirsute; stipules $\frac{3}{8}$–$\frac{1}{2}$ in. long, 3–5-setose. Flowers pentamerous, $\frac{1}{6}$–$\frac{1}{5}$ in. long when expanded, sessile or subsessile, in heads arranged in pyramidal brachiate terminal panicles which are somewhat leafy below; bracteoles subulate, exceeding the calyx, pilose. Calyx half the length of the flower; tube campanulate; glabrous or nearly so; limb longer than the tube, deeply lobed, lobes subulate. Corolla shortly salver-shaped; tube glabrous: lobes oval, apiculate, equalling the calyx. Style fusiform, exserted by the length of the flower. Fruit $\frac{1}{4}$ in. diameter.

Upper Guinea. Old Calabar River, *Mann!*

2. **R. parviflora,** *DC. in Ann. Mus. Par.* ix. 219 (1807). A climbing shrub with patent terete glabrescent branches, somewhat compressed and pilose-hirsute towards the extremities; hairs tawny. Leaves oval, shortly acuminate or apiculate, rounded or emarginate at the base, glabrate above except sometimes the depressed midrib and the 6–7 pairs of usually depressed lateral veins, more or less pilose-pubescent beneath, thinly coriaceous or subchartaceous, ranging up to 4–5 by $1\frac{1}{2}$–$2\frac{1}{4}$ in.; petiole to $\frac{1}{3}$–$\frac{3}{8}$ in., pilose or pubescent; stipules 2–4-cleft, $\frac{1}{4}$–$\frac{1}{3}$ in. long, glabrescent or sparsely pilose; lobes setaceous. Flowers pentamerous, $\frac{1}{4}$–$\frac{1}{3}$ in. long when expanded, sessile or subsessile, in small heads, assembled in pyramidal or oblong brachiate terminal panicles which are somewhat leafy below; bracteoles lanceolate or subulate. Calyx $\frac{1}{15}$–$\frac{1}{12}$ in. long; tube glabrous except the base, ovoid; limb pilose-pubescent, equalling the tube, 5-partite, segments ovate. Corolla salver-shaped; tube glabrous; lobes $\frac{1}{12}$ in. long, oval, mucronulate, rather hairy outside. Style fusiform, exserted by $\frac{1}{6}$–$\frac{1}{4}$ in. Fruit yellow, $\frac{1}{4}$ in. diameter.—DC. Prodr. iv. p. 495, Benth. in Hook. Niger Fl. p. 416, *ex parte; Rytidea parviflora,* Spreng. Syst. Veg. i. 754.

Upper Guinea. Senegambia, *Leprieur and Perrottet!* Sierra Leone, *Smeathman! Whitfield! Afzelius!* (seen in Hb. Mus. Brit.); Cape Palmas, *Th. Vogel!* Niger Expedition, at Nupe, *Barter!*

3. **R. olenotricha,** *Hiern.* A climbing shrub. Branches terete, shortly tomentose. Leaves obovate-oval, apiculate, rounded at the base, thinly coriaceous, glabrescent above except the puberulous depressed midrib and the 6–8 pairs of lateral veins, pubescent beneath at least on the prominent midrib and lateral veins and especially in their axils where are conspicuous hairy tufts, ranging up to $5\frac{1}{2}$ by 3 in.; petiole to $\frac{3}{4}$ in., patent; stipules subulate, prolonged from a broad base, quite entire, $\frac{1}{2}$–$\frac{2}{3}$ in. long, shortly pubescent. Flowers pentamerous, $\frac{1}{3}$ in. long, sessile, in little heads, assembled in brachiate terminal pyramidal panicles which are leafy at the base; bracteoles linear or lanceolate, the lower ones ovate, tridentate, pubescent, the upper ones at the base of the calyx and about equalling it. Calyx $\frac{1}{8}$ in. long, pubescent all over outside; lobes about equalling the deeply lobed limb; lobes ovate, glabrous inside. Corolla whitish, hirsute-pubescent outside; lobes oval, subapiculate, $\frac{1}{15}$ in. long; smell unpleasant. Style exserted by $\frac{1}{8}$ in.; stigma clavate-fusiform.—*R. parviflora*, Benth. in Hook. Niger Fl. p. 416, *ex parte*, non DC.

Upper Guinea. Sierra Leone, *G. Don! Wilford!*
North Central. Monbuttu-land, at Munsa, *Schweinfurth!*

4. **R. ferruginea,** *Hiern.* A scandent shrub, 15 feet high. Branches patent, terete, shortly tomentose, hairs ferruginous. Leaves oval, narrowly acuminate or apiculate, obtuse or somewhat narrowed at the base, chartaceous, glabrate except the veins above, shortly pubescent on the midrib and on the 7–8 pairs of lateral veins beneath, ranging up to $5\frac{1}{2}$ by $2\frac{5}{8}$ in.; petiole to $\frac{2}{3}$ in.; stipules entire, lanceolate-subulate, pubescent, exceeding the petiole, $\frac{1}{2}$–1 in. long. Flowers pentamerous, $\frac{1}{4}$ in. long, sessile, in heads assembled in terminal brachiate pyramidal panicles which are somewhat leafy below; bracteoles subulate or some tridentate, exceeding the calyx, pubescent. Calyx $\frac{1}{16}$ in. long, somewhat pubescent outside; lobes ovate. Corolla thinly pubescent outside, tube obsoletely so inside; lobes oval, equalling the calyx. Style thinly pubescent about the middle; stigma clavate-fusiform.

Upper Guinea. Sierra del Crystal, *Mann!*

5. **R. hispida,** *Hiern.* A climbing shrub with terete hispid branches; hairs tawny. Leaves elliptical, acutely acuminate, cordate at the base, chartaceous, strigose-hispid on both sides, rather paler beneath, $3\frac{1}{2}$–$5\frac{1}{2}$ by $1\frac{3}{8}$–2 in.; lateral veins about 6–8 pairs; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., hispid; stipules entire, filiform-subulate, hispid, $\frac{1}{2}$–$\frac{2}{3}$ in. long. Flowers pentamerous, nearly $\frac{1}{2}$ in. long, sessile, pilose-pubescent, in brachiate heads forming terminal panicles; bracteoles filiform or subulate, exceeding the small calyx, pilose-pubescent. Calyx-lobes ovate. Corolla-lobes oval, $\frac{1}{6}$ in. long. Ovary 2-celled.

Upper Guinea. River Gaboon, *Mann!*

6. **R. Smithii,** *Hiern.* Branches patent, smooth, terete, shortly pubescent towards the extremities, glabrescent. Leaves elliptical, acutely not abruptly subacuminate, narrowing towards an obtuse rounded or somewhat wedge-shaped base, chartaceous, glabrate above,

paler and glabrate except the puberulous midrib and 8–10 pairs of slender lateral veins beneath, $3\frac{1}{2}$–$5\frac{1}{2}$ by $1\frac{1}{2}$–$2\frac{1}{4}$ in.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., puberulous; stipules entire, much apiculate from a short truncate base, altogether $\frac{1}{5}$–$\frac{1}{3}$ in. long, shorter than the petiole. Flowers pentamerous, subsessile, in clusters, forming brachiate terminal pyramidal leafy panicles; bracteoles subulate. Calyx-lobes ovate. Corolla-lobes glabrous or nearly so. Stigma fusiform. Ovary 2-celled. Fruit $\frac{1}{5}$–$\frac{1}{4}$ in. diameter. Cotyledons reflexed at the apex.

Lower Guinea. Congo, *Chr. Smith!*

7. **R. decorticata,** *Hiern.* A scandent shrub of 30 feet, glabrous in most parts. Branches subterete, patent, smooth; outer bark thin, soon peeling off. Leaves broadly oval, abruptly acuminate, obtusely narrowed at the base, glabrous except little hairy tufts beneath in the axils of the 7–9 pairs of clearly marked lateral veins, thinly coriaceous, $3\frac{1}{2}$–7 by $1\frac{1}{2}$–4 in.; petiole $\frac{2}{3}$–$1\frac{1}{3}$ in. long, rather rough by the cracking and peeling of the cuticle; stipules solitary, undivided, much apiculate from a broadly ovate or subtruncate base, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Flowers pentamerous (perhaps also by exception tetramerous), $\frac{1}{5}$ in. long on shorter bracteolate pedicels in divaricately branched terminal and sessile or lateral and pedunculate panicles; bracteoles lanceolate, somewhat pubescent, falling short of the calyx-limb, some with a small lobe on each side of the base. Calyx $\frac{1}{15}$ in. long; limb half-cleft; tube glabrous or nearly so; lobes ovate, often ciliolate. Corolla glabrous throughout; tube short; lobes oval, $\frac{1}{8}$ in. long. Style glabrous; stigma clavate-fusiform.

Upper Guinea. Cameroon Mountains, at 2000–3000 feet alt., *Mann!*

8. **R. membranacea,** *Hiern.* Shrubby, perhaps scandent, nearly glabrescent. Branches slender, compressed minutely puberulous and sulcate towards the extremities. Leaves broadly elliptical, acuminate or emarginate, obtusely or acutely narrowed and oblique at the base, membranous, glabrescent except little puberulous tufts in the axils of the 7 pairs of slender lateral veins beneath, $2\frac{1}{2}$–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; petiole $\frac{1}{4}$–$\frac{1}{2}$; stipules entire, much apiculate from a short truncate base, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Flowers tetramerous or by exception pentamerous, $\frac{1}{5}$ in. long, on short slender puberulous pedicels, numerous, in dense terminal corymbs; bracteoles small, puberulous, falling short of the calyx-limb. Calyx very small; tube glabrous; limb half-cleft, lobes ovate puberulous. Corolla glabrous throughout; lobes oval, $\frac{1}{15}$ in. long. Style glabrous, exserted by the length of the flower; stigma globose, 2–3-lobed. Ovary 2–3-celled.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

9. **R. glabra,** *Hiern.* A scandent shrub, glabrous except the inflorescence. Branches terete, at the extremities compressed and sulcate; cuticle easily peeling. Leaves elliptic-oblong, acuminate, obliquely narrowed or one side, obtuse at the base, firmly chartaceous, spreading, turning black in the dry state, 3–6 by 1–2 in., or the uppermost at the base of the inflorescence smaller; lateral veins about 5

pairs, slender, inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. long; stipules solitary, entire, apiculate from a subtruncate base, $\frac{1}{10}$–$\frac{1}{8}$ in. long. Flowers tetramerous, $\frac{1}{2}$ in. long (or rather more) when expanded, glabrous, slender, on very short glabrate pedicels, numerous, in dense terminal somewhat puberulous corymbs of about 2 in. diameter; bracteoles small, puberulous, falling short of the calyx. Calyx $\frac{1}{20}$ in. long; limb half-cleft; lobes ovate. Corolla white with herbaceous apex (Rev. W. C. Thomson mss.), lobes oval, $\frac{1}{8}$ in. long. Style glabrous, exserted by $\frac{1}{3}$ in.; stigma clavate-egg-shaped.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

10. **R. fuscescens,** *Hiern.* Hispidulous. Branches terete. Leaves ovate-elliptical, subacuminate, narrowed or rounded at the base, chartaceous, turning blackish in the dry state, $1\frac{1}{2}$–3 by $\frac{2}{3}$–$1\frac{1}{2}$ in.; lateral veins about 5–6 pairs, rather slender; petiole $\frac{1}{6}$–$\frac{3}{8}$ in.; stipules solitary, entire subulate, prolonged from a short broad base, $\frac{1}{5}$–$\frac{1}{3}$ in. long. Flowers tetramerous, $\frac{1}{3}$–$\frac{3}{8}$ in. long when expanded, on short hispidulous pedicels, in terminal subsessile dense corymbs of about 3 in. diameter; bracteoles narrow, falling short of the calyx-limb, hispidulous. Calyx $\frac{1}{15}$ in. long, hispidulous, limb half-cleft; lobes 4, ovate. Corolla glabrous throughout; lobes 4, broadly oval, $\frac{1}{10}$ in. long. Style glabrous, exserted by $\frac{1}{6}$–$\frac{3}{16}$ in.; stigma clavate-ovoid.

Mozamb. Distr. Moramballa, at 2000 feet alt., *Kirk!*

60. **MORINDA,** Vaill.; Benth. et Hook. f. Gen. Pl. ii. p. 117.

Calyx-tubes campanulate, connate at the base, confluent in fruit; limb truncate or nearly so, persistent, not accrescent. Corolla salver-shaped, coriaceous; tube rather slender; throat glabrous or somewhat bearded; lobes 5–6, valvate in the bud. Stamens 5–6, inserted at the throat of the corolla, glabrous, partly exserted; anthers linear, fixed at the back near the middle; filaments short. Disk fleshy, cushion-shaped, glabrous. Ovary usually 4-celled, sometimes imperfectly so; style included or exserted, glabrous or pubescent, bifid; ovules solitary, ascending from the base of the septa, anatropous or amphitropous. Fruit a syncarpium, succulent; seeds obovoid or reniform or folded on itself; testa membranous; albumen fleshy; embryo often somewhat curved, radicle inferior.—Trees or shrubs, sometimes scandent, glabrous or nearly so, with oval shortly petiolate leaves, intrapetiolar deciduous stipules connate at the base, and white or yellowish flowers sessile in pedunculate ebracteolate heads.

A considerable genus spread over the tropics of the world.

Peduncles axillary and terminal, often leaf-opposed. Flowers mostly pentamerous	1. *M. citrifolia.*
Peduncles terminal or terminating short lateral branches, not leaf-opposed. Flowers hexamerous	2. *M. longiflora.*

1. **M. citrifolia,** *Linn. Sp. Pl.* 176 (1753). A glabrous (or nearly glabrous) tree, sometimes of immense size. Branches quadran-

gular or subterete, compressed towards the extremities. Leaves oval shortly pointed at the apex, wedge-shaped or nearly rounded at the base, opposite or those opposite the peduncles often without the opposite leaves, lucid, chartaceous or slightly fleshy, ranging up to 9 in. long and 6 in. wide; lateral veins about 6–8 pairs; petiole under $\frac{1}{2}$ in.; stipules rounded, foliaceous, ranging up to $\frac{3}{4}$ in. diameter, connate at the base, caducous. Flowers about $\frac{1}{2}$–1 in. long or more, usually pentamerous, sessile, 6–24 or more together in heads which in fruit range from $\frac{1}{4}$–1 in. diameter or more; common peduncles solitary or 2–3 together, usually leaf-opposed, ranging up to 3 in., more or less compressed. Calyx green, truncate. Corolla thickly coriaceous, white, green, or greenish yellow; lobes ovate-lanceolate, scarcely acute.—*M. quadrangularis*, G. Don, Gen. Syst. iii. p. 545. *M. lucida*, Benth. in Hook. Niger Fl. 406, may be regarded as a variety with subterete branches and comparatively slender peduncles; it becomes a large tree; *M. geminata*, DC. Prodr. iv. 447, may be a state with the lower surface of the leaves subpubescent. *M.? chrysorhiza*, DC. Prodr. iv. 450 (*Psychotria? chrysorhiza*, Thonn. in Schum. Beskr. Guin. Pl. 111) is apparently synonymous with this species. *M. macrophylla*, Desf. Cat. Hort. Par., ed. 3, p. 404.

The Indian synonymy is not given.

Upper Guinea. Senegambia, *Heudelot! Perrottet and Leprieur;* Guinea, *Thonning* Cape Coast, *Brass!* Sierra Leone, *Afzelius! G. Don! Barter!* ("Brimstone tree," used for flooring, resists insects), *Daniell!* (flowers May—July, Tolmgah or brimstone tree); *Th. Vogel! Smeathman!* (Rotomba Island), *Kirk!* Niger Expedition, at Onitsha, *Barter!* (used in dysentery and fever, astringent), at Nupe, *Barter!* Fernando Po, *Th. Vogel! Barter!* (bitter and astringent, good in dysentery); Abbeokuta, *Barter! Dr. Irving!* Cameroons River and Bagroo River, *Mann!* (excellent wood, insects do not touch it),

Lower Guinea. Congo, *Chr. Smith!*

Widely spread over the shores of Tropical Asia, the Pacific Islands, and Queensland; occurs also in the Seychelles Islands.

North Central. Monbuttu-land, between Kapili and Kibali, *Schweinfurth!*

2. **M. longiflora,** *G. Don, Gen. Syst.* iii. p. 545. A glabrous shrub, scandent or with pendulous branches, of 8–20 feet. Branches subterete, wiry, patent, rather supra-axillary, at the extremities somewhat compressed. Leaves opposite, oval, acuminate or cuspidate, wedge-shaped or nearly rounded at the base, thinly coriaceous, lucid, 2–6 by 1–3 in.; lateral veins about 3–5 pairs, clearly marked below; petiole $\frac{1}{6}$–$\frac{1}{2}$ in., rather slender; stipules short, broad, connate and sheathing. Flowers 1–2 in. long, 3–8 together, sessile; heads terminal or terminating short lateral branches, sometimes overtopped by the axillary shoots; common peduncles solitary or two together, $\frac{1}{4}$–$1\frac{1}{2}$ in. long, slender in flower, robust and expanded upwards in fruit. Calyx green, glabrous or puberulous; limb cup-shaped, truncate or nearly so. Corolla white or copper-coloured; lobes 6, lanceolate. Fruit $\frac{2}{3}$–$1\frac{1}{2}$ in. diameter, of deep orange colour.

Upper Guinea. Sierra Leone, *Afzelius! G. Don!* Western Africa, *Whitfield* Niger Expedition, at Eppah, *Barter!* Bagroo River, *Mann!* Gaboon River, *Mann* Fernando Po, *Th. Vogel! Barter! Mann!*

North Central. Monbuttu-land, *Schweinfurth*, sap milky; native name "Mbogga."

Nile Land. Niamniam-land, at Faru, *Schweinfurth !*

Lower Guinea. Congo, *Chr. Smith !*

There are two states or varieties of this plant, one with puberulous ovary, the other with glabrous ovary; the latter seems to be confined to Fernando Po.

61. PSYCHOTRIA, Linn.; Benth. et Hook. f. Gen. Plant. ii. p. 123 (excl. Grumilea; incl. CHASALIA, Commers., Benth. et Hook. f. l.c. 126.)

Calyx usually small; limb shortly cup-shaped, subtruncate or toothed or lobed. Corolla funnel- or salver-shaped or cylindrical, short or rather elongated, usually 5- rarely 6- or 4-lobed; tube straight or curved; throat usually bearded; lobes ovate or lanceolate, rarely appendaged at the back, valvate in æstivation. Stamens equal in number to the lobes of the corolla, included or exserted, inserted on the throat, glabrous; anthers linear or oblong, fixed at the back rather above the base; filaments short or nearly as long as the anthers. Disk cushion-shaped or elevated, undivided or sulcate-lobed, glabrous. Ovary 2-celled; style filiform, bifid bidentate or nearly entire, glabrous or somewhat hairy, included or exserted; ovules solitary, compressed, smooth, erect; placentas inconspicuous. Fruit subglobose or ovoid, sometimes subdidymous; pyrenes 2, or by abortion solitary, usually ribbed on the back. Seeds costate or sulcate; albumen uniform, radicle inferior.—Shrubs or small trees with opposite or verticillate leaves, undivided or dentate or cleft stipules and small cymose hermaphrodite flowers arranged in terminal or rarely axillary panicles or heads.

A large genus occurring throughout the tropics, very numerously represented in America; all our species, except *P. obtusifolia*, Poir., appear to be endemic.

Flowers usually straight and funnel-shaped or shortly cylindrical, $\frac{1}{12}$–$\frac{1}{3}$ in. long.
  Bracts and bracteoles minute or obsolete.
    Flowers tetramerous (is one species few, 4–5-merous) — I. TETRAMERÆ.
    Flowers numerous, pentamerous or occasionally hexamerous.
      Inflorescence paniculate, not in solitary dense heads . . . . . — II. PANICULATÆ.
      Inflorescence small, dense, subcapitate . . . — III. CONFERTIFLORÆ.
  Bracts or bracteoles, or both, present, not minute . . — IV. BRACTEATÆ.
Flowers usually curved and salver-shaped, $\frac{1}{2}$–1 in. long . — V. CHASALIA.

I. TETRAMERÆ.

Corolla-lobes without appendages.
  Inflorescence pedunculate. Branchlets without longitudinal ridges.
    Anthers exserted.
      Inflorescence consisting of few 4–5-merous flowers. — 1. *P. pauridiantha.*
      Inflorescence consisting of many 4-merous flowers. — 2. *P. brachyantha.*
    Anthers included or nearly so.
      Leaves $2\frac{1}{2}$–6 in. long; lateral veins about 8–9 pairs; tertiary veins inconspicuous.

Shoots green, glabrous. Peduncles ½ in. long . 3. *P. setacea.*
Shoots reddish, branny-puberulous. Peduncles 1 in. long . . . . . 4. *P. Mannii.*
Leaves 7–9 in. long; lateral veins about 15–16 pairs; tertiary veins conspicuous . . . . 5. *P. foliosa.*
Inflorescence subsessile. Branchlets marked with decurrent ridges between the upper nodes . . . . 6. *P. lophoclada.*
Corolla-lobes each with a spreading linear horn nearly as long as the tube.
Glabrous. Leaves acuminate . . . . . 7. *P. cornuta.*
Hairy. Leaves obtuse, not acuminate . . . . 8. *P. humilis.*

II. Paniculatæ.

Corolla-lobes flat, not keeled nor crested at the back.
Stipules bifid bidentate bisetose or bi-tricuspidate.
Stipules ⅛–½ in. long, not sheathing.
Inflorescence pyramidal or corymbose, lax, pedunculate.
Tertiary veins not conspicuous. Epigynous disk not sulcate.
Shoots bifariously hairy. Inflorescence slender 9. *P. bifaria.*
Shoots glabrous or puberulous, not bifariously hairy. Inflorescence not slender.
Leaves almost veinless . . . . . 10. *P. umbellata.*
Leaves of nearly the same colour on both surfaces; lateral veins strongly marked 11. *P. monticola.*
Leaves paler beneath; lateral veins slender.
Leaves coriaceous; lateral veins about 7–8 pairs . . . . . 12. *P. calva.*
Leaves chartaceous; lateral veins about 12–15 pairs.
Panicles axillary and subterminal; peduncle ⅓–¾ in. long. Leaves 4½–6 in. long . . . . . 13. *P. leptophylla.*
Corymbs lateral, small; peduncle ⅓ in. long. Leaves 7–8½ in. long . . 14. *P. Doniana.*
Tertiary veins conspicuous beneath. Epigynous disk ribbed and sulcate . . . . . 15. *P. konguensis.*
Inflorescence globose, sessile or shortly pedunculate, dense.
Style exserted. Leaves ovate-oval, some black-punctate . . . . . 16. *P. subpunctata.*
Style included. Leaves obovate-oval, not punctate . . . . . 17. *P. brunnea.*
Stipules ½–¾ in. long, sheathing . . . . . 18. *P. longevaginalis.*
Stipules undivided, entire.
Inflorescence subglobose or umbelliform, subsessile or shortly pedunculate; flowers ⅛–¼ in. long.
Stipules glabrous. Calyx subtruncate, shortly toothed.
Leaves 3–9 in. long; lateral veins about 8–10 pairs. A shrub. Flowers pentamerous . 19. *P. gabonica.*
Leaves 8–14 in. long; lateral veins about 12 pairs. A tree. Flowers 5–6-merous . . 20. *P. arborea.*
Stipules shaggy inside. Calyx cleft . . . . . 21. *P. sciadephora.*
Inflorescence pyramidal or corymbose; common peduncles 1–2 in. long; flowers ⅛–¼ in. long.
Leaves obtuse, not acuminate.

Calyx glabrous.
Leaves chartaceous, 1–3 in. long . . . . . 22. *P. punctata.*
Leaves thickly coriaceous, 3–5 in. long . . . 23. *P. obtusifolia.*
Calyx-teeth ciliate . . . . . 24. *P. zambesiana.*
Leaves acuminate or acute.
Leaves 1–1½ in. long . . . . . 25. *P. Kolly.*
Leaves 2–7 in. long,
Calyx-limb very short, truncate . . . . . 26. *P. Benthamiana.*
Calyx-limb 5-dentate.
Flowers 2–3 together . . . . . 27. *P. owariensis.*
Flowers several together in little clusters . 28. *P. Brassii.*
Inflorescence corymbose; common peduncle short; flowers ¼–⅜ in. long . . . . . 29. *P. Afzelii.*
Corolla-lobes keeled and crested at the back . . . . . 30. *P. cristata.*

III. Confertifloræ.

Stipules undivided, entire.
Calyx-limb short. Branchlets abruptly narrower than the branches of the previous season . . 31. *P. abrupta.*
Calyx-limb larger than the ovary. Branchlets not abrupt . . . . . 32. *P. anetoclada.*
Stipules bifid bicuspidate or bipartite.
Leaves not punctate. Calyx shortly toothed or cleft or entire.
Pubescent . . . . . 33. *P. Kirkii.*
Glabrous or subglabrous.
Calyx subentire. Stipules bipartite, recurving . 34. *P. recurva.*
Calyx-limb cleft. Stipules not recurving.
Leaves acuminate. Stipules bidentate . . 35. *P. subobliqua.*
Leaves not acuminate. Stipules cleft, bicuspidate . . . . . 36. *P. pumila.*
Leaves black-punctate. Calyx deeply lobed . . . 37. *P. nigropunctata.*

IV. Bracteatæ.

Silky-pubescent. Calyx-limb unequally 5-partite . . . 38. *P. bracteosa.*
Glabrous or puberulous. Calyx-limb subentire or equally cleft.
Flower-heads solitary, sessile or subsessile.
Stipules tricuspidate, rather large, ⅔ in. long . . . 39. *P. globosa.*
Stipules bidentate or undivided, small, ⅛–¼ in. long.
Style included or shortly exserted.
Corolla-throat densely bearded. Style shortly exserted, shortly lobed . . . . . 40. *P. insidens.*
Corolla-throat thinly pubescent. Style included, shortly lobed.
Calyx as long as the ovary. Corolla subcylindrical . . . . . 41. *P. subherbacea.*
Calyx shorter than the ovary. Corolla funnel-shaped . . . . . 42. *P. infundibularis.*
Corolla-throat nearly naked. Style scarcely lobed . . . . . 43. *P. submuda.*
Style much exserted . . . . . 44. *P. longistylis.*
Flower-heads or flowers paniculate, pedunculate.
Heads few, compact. Calyx-teeth ciliate . . . . 45. *P. bidentata.*
Flowers in numerous small clusters or divaricately paniculate. Calyx-teeth ciliolate or glabrate.
Calyx-limb longer than the ovary or as long as it.
Leaves coriaceous . . . . . 46. *P. Vogeliana.*

Leaves chartaceous.	
Stipules $\frac{1}{2}$–$\frac{3}{4}$ in. long; bracts large.	
Lateral veins of the leaves about 20 pairs .	47. *P. latistipula.*
Lateral veins of the leaves about 13 pairs .	48. *P. Schweinfurthii.*
Stipules $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts small.	
Stipules bifid. Stomata inconspicuous.	
Leaves 6–8 in.	49. *P. lucens.*
Leaves $1\frac{1}{2}$–5 in.	50. *P. reptans.*
Stipules entire or bidentate; leaves scattered with black dots	51 *P. mucronata.*
Stipules undivided. Stomata conspicuous .	52. *P. stictophylla.*
Calyx-limb shorter than the ovary.	
Leaves paler beneath	53. *P. obscura.*
Leaves of nearly the same colour on the two surfaces.	
Style glabrous. Stipules obovate-rotund . .	54. *P. crispa.*
Style puberulous. Stipules ovate-lanceolate .	55. *P. trachystyla.*
Heads solitary, rather dense	56. *P. Soyauxii.*
V. Chasalia.	
Flowers crowded in subsessile heads	57. *P. virens.*
Flowers in lax or dense but not capitate pedunculate cymes.	
Corolla glabrous outside. Leaves glabrous.	
Leaves much acuminate	58. *P. Ansellii.*
Leaves shortly or scarcely acuminate.	
Flowers $\frac{1}{2}$–$\frac{2}{3}$ in. long. Calyx 5-cleft	59. *P. zanguebarica.*
Flowers nearly 1 in. long. Calyx subtruncate .	60. *P. umbraticola.*
Corolla pubescent outside. Leaves pubescent beneath.	61. *P. nubica.*

1. **P. pauridiantha,** *Hiern.* Glabrous. Branches terete, dark, compressed towards the extremities. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, of nearly the same colour on both surfaces, spreading, 3–5 by $\frac{3}{4}$–$1\frac{1}{3}$ in., margins narrowly revolute; lateral veins about 7 pairs, slender; petiole $\frac{1}{10}$–$\frac{1}{6}$ in. long; stipules ovate or lanceolate, bifid, $\frac{1}{6}$–$\frac{1}{5}$ in. long, teeth filiform-subulate; sometimes an additional small tooth occurs on each side near the base of the stipule. Flowers 4–5-merous, about $\frac{1}{8}$ in. long, on rather shorter slender pedicels, forming small pedunculate ebracteate terminal few-flowered cymes; common peduncle slender, $\frac{2}{3}$ in. long. Calyx-limb small, shortly toothed. Corolla 4–5-fid; throat thinly bearded. Anthers exserted. Style bifid, included.

Upper Guinea. Sierra del Crystal, *Mann!*

2. **P. brachyantha,** *Hiern.* A nearly glabrous shrub, about 6 feet high. Branches terete, somewhat compressed towards the extremities. Leaves oval or oblong, subacuminate, wedge-shaped at the base, thinly chartaceous, glabrous, 3–9 by $1\frac{1}{6}$–$3\frac{1}{2}$ in., margins repand-revolute; lateral veins about 11 pairs, slender, not conspicuous; petioles ranging up to $\frac{1}{2}$ in.; stipules about $\frac{1}{4}$ in. long from an ovate base, puberulous at the back, tips setaceous. Flowers tetramerous, about $\frac{1}{12}$ in. long when expanded, on short slender pedicels, in terminal trichotomous subcorymbose pedunculate panicles of about $1\frac{1}{2}$ in. diam.; bracts obsolete, bracteoles small, subulate; common peduncle 1–3 in. long, slender.

Calyx small; limb about as long as the ovary; teeth small. Corolla 4-fid; throat thinly bearded. Anthers exserted. Style bidentate, glabrous, included; teeth indistinct, erect.

Upper Guinea. Fernando Po, *Mann!*

3. **P. setacea,** *Hiern.* A glabrous glaucescent shrub, 2–3 feet high. Branchlets more or less compressed. Leaves oval, acuminate, wedge-shaped at the base, membranous, 5–6 by 2–2½ in., rather paler beneath; margins narrowly revolute, subrepand; lateral veins about 8–9 pairs, slender, pale; petiole ⅔–1 in.; stipules ⅕–¼ in. long, from an ovate base, somewhat puberulous outside, points setaceous. Flowers tetramerous, $\frac{1}{12}$–$\frac{1}{10}$ in. long, on rather shorter divaricating pedicels, numerous, in hemispherical shortly pedunculate terminal panicles of 1½–2 in. diam.; common peduncle ½ in. long; bracts obsolete; bracteoles minute. Calyx-limb small, about as long as the ovary, subtruncate. Corolla short, 4-fid; throat somewhat bearded. Anthers nearly included. Style glabrous, included, shortly bifid, with diverging lobes.

Upper Guinea. Cameroon Mountains, at 4000 feet elevation, February, *Mann!*

4. **P. Mannii,** *Hiern.* A shrub. Branches reddish brown, terete reddish-branny and slightly compressed towards the extremities. Leaves oval, subacuminate, usually wedge-shaped at the base, glabrous, chartaceous, rather pale on both surfaces, 2½–4 by 1–1¾ in., margins very narrowly revolute; lateral veins about 8–9 pairs, slender; stipules $\frac{1}{6}$–$\frac{1}{5}$ in. long, from an ovate reddish branny base, terminating in 2 setaceous points. Flowers tetramerous, ⅛ in. long, on shorter pedicels, several together, forming slender pyramidal brachiately branched pedunculate ebracteate terminal puberulous panicles rather more than an inch long and equalling the common peduncle. Calyx-limb short; teeth short. Corolla straight; throat bearded. Anthers included. Style included, bifid. Fruit $\frac{1}{6}$–$\frac{1}{5}$ in. diam.

Upper Guinea. River Gaboon, *Mann!*

5. **P. foliosa,** *Hiern.* A small glabrous shrub, 2–3 feet high. Branches very leafy at the extremities. Leaves oblanceolate, shortly acuminate, narrowed gradually downwards towards the obtuse base, chartaceous, 7–9 by 2–2¼ in., margins narrowly revolute; lateral veins about 15–16 pairs, clearly marked beneath as well as the tertiary veins; petiole about ½ in.; stipules about ⅓ in. long, apparently bifid. Flowers $\frac{1}{7}$ in. long, tetramerous, on short rather thick pedicels or subsessile, closely set in brachiate subterminal pedunculate cymes of about 1½ in. in breadth; common peduncle strict, rather slender, about 3¼ in. long; bracts and bracteoles obsolete. Calyx-limb short, cleft, about as long as the ovary and equalling the disk. Corolla-throat bearded. Anthers included.

Upper Guinea. Sierra del Crystal, *Mann!*

6. **P. lophoclada,** *Hiern.* Glabrous, shrubby, closely branched, pale yellowish throughout; branches terete; branchlets subterete, with

two opposite longitudinal ridges decurrent between the upper nodes. Leaves oval-ovate, more or less acuminate, somewhat wedge-shaped at the base, chartaceous, of nearly the same colour on both surfaces, lucid, $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{2}$ in., margins somewhat revolute, lateral veins about 7–9 pairs, slender, not conspicuous; petiole $\frac{1}{12}$–$\frac{1}{4}$ in.; stipules deltoid, apiculate, undivided, rigid, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, tetramerous, subsessile, crowded, several together, in subsessile terminal clusters; bracts mostly like the stipules but smaller; bracteoles minute or obsolete. Calyx-limb scarcely as long as the ovary, 4-toothed. Corolla-throat bearded; lobes not appendaged. Fruit $\frac{1}{3}$ in. long, ovoid, dicoccous; cocci marked on the back with 3 blunt ridges. Albumen of the seeds uniform; radicle inferior.

Upper Guinea. Sierra Leone, *Afzelius! G. Don!*; on Sugar Loaf Mountain, *Barter!*

Fruit seen in Hb. Smith.

7. **P. cornuta,** *Hiern.* A dwarf glabrous undershrub. Stem simple or but little branched, subterete below, compressed above. Leaves oval often broadly so, shortly acuminate, wedge-shaped at the base, chartaceous, of nearly the same colour on both sides, 2–3 by $\frac{4}{5}$–$1\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 6 pairs, slender; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules ovate-acuminate, bifid, $\frac{1}{8}$–$\frac{1}{5}$ in. long, sheathing at the base, lobes subulate, lax. Flowers $\frac{1}{10}$ in. long, tetramerous, on shorter pedicels, in small divaricately branched oval terminal cymes of $\frac{1}{2}$ in. long; common peduncle $\frac{1}{4}$–$\frac{1}{2}$ in.; bracts and bracteoles minute or obsolete. Calyx-limb about as long as the ovary and wider than it, very shortly lobed. Corolla-tube cylindrical, straight; lobes 4, deltoid, very small, furnished at the back each with a spreading linear horn nearly as long as the tube. Stamens included. Style included, with 2 very short erect branches. Berries $\frac{1}{6}$ in. long; albumen of the seeds cartilaginous, uniform.

Upper Guinea. Fernando Po, *Mann!*

8. **P. humilis,** *Hiern.* A dwarf undershrub about 6 in. high. Stems erect, simple, glabrate and subterete below, somewhat compressed and hairy above. Leaves oval or somewhat obovate, obtusely pointed or mucronulate, wedge-shaped at the base, scattered with crisped hairs on both sides, rather paler beneath, chartaceous, about $1\frac{1}{2}$–3 by $\frac{2}{3}$–$1\frac{1}{4}$ in., lateral veins about 6 pairs, not conspicuous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, hairy; stipules fugacious. Flowers very small, glabrous, tetramerous, on short pedicels, about 6 together, in terminal clusters; common peduncle $\frac{1}{6}$ in. long, glabrous; bracteoles minute. Calyx-limb short, very shortly lobed. Corolla-tube straight, cylindrical; lobes 4, very small, deltoid, furnished at the back each with a patent linear horn nearly as long as the tube. Stamens included. Style glabrous, as long as the corolla-tube; stigma subcapitate.

Upper Guinea. 1° N. lat. Corisco Bay, *Mann!*

9. **P. bifaria,** *Hiern.* A small shrub, 2 feet high; branches scarcely woody, somewhat tumid below the nodes, towards the extremities bifariously hairy. Leaves elliptical, acuminate, wedge-shaped

at the base, glabrous, chartaceous, rather paler beneath, $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–1 in., margins revolute; petiole $\frac{1}{8}$–$\frac{1}{4}$ in., hispidulous; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. long, from an ovate or lanceolate base, shortly hairy at the back, terminating in 2 setaceous points. Flowers pentamerous, $\frac{1}{6}$ in. long, on slender pedicels, several, forming terminal corymbose or hemispherical panicles of $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; common peduncle $\frac{1}{2}$ in., very slender; bracts minute or obsolete. Calyx green; limb small; teeth short. Corolla white; tube funnel-shaped, straight; throat bearded. Anthers included. Style short, bifid. Young fruit oblique.

Upper Guinea. Fernando Po, *Mann!*

10. **P. umbellata,** *Thonning in Schum. Beskr. Guin. Pl.* p. 109, *non Arrab.* A much branched shrub; branches alternately compressed, glabrous. Leaves lanceolate, shining, scarcely petiolate, 2–4 in. long, almost without veins, shining; stipules acuminate, bidentate at the apex, deciduous. Peduncles axillary, angular, 2 in. long, brachiate-trifid; pedicels of each branch clustered at the apex in a little umbel. Calyx-limb obsoletely 5-toothed. Corolla tubular-campanulate, whitish; tube pubescent inside, $\frac{1}{12}$ in. long; limb 5-cleft, lobes ovate, acute, reflexed, half as long as the tube. Filaments 5, inserted at the mouth of the corolla-tube, equalling the corolla, erect; anthers oblong, white. Ovary very small; style filiform, a little longer than the corolla-tube; stigma rather thick, blunt, bifid. Fruit globose, crowned with the remains of the calyx-limb, red, shining, size of a currant. Seeds 2, hemispherical.

Upper Guinea. Guinea, about Adah, not very common, *Thonning*.
The description is taken from Thonning; I have seen nc specimen.

11. **P. monticola,** *Hiern.* A small tree, about 15 feet high, not quite glabrous. Branches terete, towards the tips somewhat compressed and leafy. Leaves elliptical, narrowed at both ends, acute or narrowly acuminate, chartaceous, slightly hairy beneath along the midrib or at the forks of the 9–10 pairs of clearly marked lateral veins, 6–$8\frac{1}{2}$ by 2–$3\frac{1}{4}$ in., margins narrowly revolute; petiole $\frac{2}{3}$–$1\frac{1}{3}$ in.; stipules lanceolate, bifid, thickened at the back over the lower half with a reddish hairy boss, nearly $\frac{1}{4}$ in. long. Flowers about $\frac{1}{6}$ in. long or rather less, on short pedicels (elongated in fruit), several together, in divaricately branched rather lax pedunculate ebracteolate rounded glabrous panicles of 1 in. or more diam. increasing to about $3\frac{1}{2}$ in. diam. in fruit; common peduncle 1–3 in. diam. Calyx hemispherical, $\frac{1}{12}$ in. diam.; limb longer than the ovary, subtruncate. Corolla 6-lobed. Anthers included. Style bifid. Fruit (immature) ovoid, $\frac{1}{4}$ in. long, faintly ribbed.

Upper Guinea. Island of St. Thomas, at the summit of the peak, *Mann!*

12. **P. calva,** *Hiern.* A quite glabrous smooth shining shrub, about 10 feet high; the youngest parts sometimes ciliate or downy. Branches terete, towards the extremities compressed, nodes rather dilated. Leaves oval, shortly narrowed at the apex, wedge-shaped at the base, thinly coriaceous, 3–8 by $1\frac{1}{2}$–3 in., lateral veins about 7–8 pairs; margins recurved; petiole $\frac{1}{2}$–$1\frac{2}{3}$ in.; stipules ovate, apiculate,

$\frac{1}{8}$–$\frac{1}{7}$ in. long, caducous, bidentate at the apex. Flowers rather numerous, on short pedicels, in divaricately branched, quasi-axillary, subterminal or terminal pedunculate panicles of 1–4 in. diam.; common peduncle $\frac{3}{4}$–3 in. long; bracteoles obsolete. Calyx-limb truncate, minutely toothed, half the length of the ovary. Corolla 5-lobed; throat bearded. Anthers 5, oblong, fixed at the back near the middle. Berry $\frac{1}{5}$–$\frac{1}{4}$ in. long, faintly ribbed, of a fine red colour when ripe.—*Pavetta ? lævis*, Benth. in Hook. Niger Fl. 415.

Upper Guinea. Fernando Po, *Th. Vogel! Barter!* Gaboon River, *Mann!*

13. **P. leptophylla,** *Hiern.* Quite glabrescent. Branches terete, dark-ashy, somewhat compressed towards the extremities. Leaves oval, shortly narrowed at the apex, more or less wedge-shaped at the base, thinly chartaceous, $4\frac{1}{2}$–6 by 2–$2\frac{1}{2}$ in., margins narrowly revolute; lateral veins about 12–15 pairs, spreading, rather close together, upper internodes short; petiole $\frac{1}{3}$–1 in.; stipules deltoid, bidentate at the tip, very caducous. Flowers rather numerous, shortly pedicellate, in divaricately branched rather dense axillary and subterminal panicles; common peduncles (in fruit) $\frac{1}{2}$–$\frac{3}{4}$ in.; bracteoles obsolete. Berries $\frac{1}{5}$–$\frac{1}{4}$ in. long, red when ripe.—*Pavetta ? tenuifolia*, Benth. in Hook. Niger Fl. 415.

Upper Guinea. Fernando Po, *Th. Vogel!*

14. **P. Doniana,** *Benth. in Hook. Niger Fl.* 419. A small shrub. Branches slightly scabrid, terete, at the extremities compressed and puberulous. Leaves opposite, obovate-elliptical, obtusely subacuminate, attenuate at the base, membranous, paler beneath, not punctate, glabrous, 7–$8\frac{1}{2}$ by 2–$2\frac{1}{2}$ in., spreading, margins narrowly revolute; lateral veins about 14–15 pairs, slender; petiole $\frac{1}{3}$–$\frac{4}{5}$ in.; stipules broadly ovate, pale, glabrous, bidentate, $\frac{1}{6}$–$\frac{1}{5}$ in. long, caducous. Flowers subsessile, crowded several together in little heads on small trichotomous lateral corymbs of about 1 in. diam.; bracts subobsolete; bracteoles subulate, small; common peduncle $\frac{1}{3}$ in. long. Calyx-limb small, shorter than the ovary, 5 ?-lobed. Corolla not seen. 'Berry $\frac{1}{4}$ in. diam.'

Upper Guinea. Island of St. Thomas, *G. Don!*

15. **P. konguensis,** *Hiern.* A small shrub, 2–3 feet high, not quite glabrous. Leaves oblanceolate, very shortly and obtusely acuminate, gradually narrowed downwards to near the base, glabrous, chartaceous, 6–7 by 2–$2\frac{1}{2}$ in., margins very narrowly revolute; lateral veins about 17 pairs, clearly marked as well as the oblique tertiary veins; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long; stipules ovate-lanceolate, $\frac{1}{2}$ in. long, hairy with reddish hairs outside, tricuspidate. Flowers pentamerous, about $\frac{1}{8}$ in. long, on shorter pedicels, several together in pedunculate subterminal dense brachiate glabrous cymes of $\frac{3}{4}$ in. breadth; common peduncle slender, about $1\frac{3}{4}$ in. long; bracts and bracteoles minute. Calyx-limb as long as the ovary, subtruncate or shortly and irregularly toothed. Corolla-tube short; throat bearded. Anthers exserted. Disk alternately ribbed and sulcate, scarcely equalling the calyx-limb.

Upper Guinea. Mount John River, Kongui, 1° N. lat. *Mann!*

16. **P. subpunctata,** *Hiern.* A glabrous shining shrub, 6 feet high. Branches terete, smooth, towards the extremities compressed. Leaves ovate-oval, attenuate at both ends, rather abruptly so at the base, membranous, rather paler beneath, black-punctate, 4–8 by $1\frac{1}{3}$–$2\frac{1}{2}$ in., margins nearly flat; lateral veins about 8–10 pairs, slender, clearly marked beneath; petiole 1–2 in.; stipules deltoid, $\frac{1}{4}$ in. long, shortly bifid, lobes apiculate. Flowers $\frac{1}{8}$ in. long, on shorter pedicels, in dense globose shortly pedunculate terminal cymes of 1–$1\frac{1}{2}$ in. diam.; common peduncle $\frac{1}{4}$–$\frac{2}{3}$ in.; bracts and bracteoles obsolete. Calyx-limb about equalling the ovary, subentire. Corolla-lobes 5; throat bearded. Anthers nearly included. Style exserted.

Upper Guinea. By the River Kongui, 1° N. lat., *Mann!*

17. **P. brunnea,** *Schweinf. mss. in herb.* A puberulous shrub. Branches glabrescent, smooth, terete; at the extremities compressed and puberulous with short crisp hairs. Leaves obovate-oval, abruptly acuminate, wedge-shaped at the base, membranous, puberulous beneath at least along the midrib and the 10–12 pairs of lateral veins, 3–7 by $1\frac{1}{3}$–3 in.; petiole $\frac{1}{4}$–$1\frac{1}{4}$ in. long, puberulous, patent; stipules deltoid, about $\frac{1}{8}$–$\frac{1}{6}$ in. long, bicuspidate at the tip, caducous; upper internodes abbreviated. Flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, sessile or subsessile, numerous, arranged in radiately and trichotomously branched sessile terminal globose puberulous cymes of 1–$1\frac{1}{2}$ in. diam.; bracteoles very short. Calyx puberulous, urceolate; limb about as long as the ovary, shortly and obscurely lobed. Corolla brown-purple; tube short, straight; throat bearded; lobes 5, short. Anthers 5, partly exserted. Style bifid, included.

North Central. Monbuttu-land, on the right bank of the Kibali River, *Schweinfurth!*

18. **P. longevaginalis,** *Schweinf. mss. in herb.* A nearly glabrous shrub, 15 feet high. Branches terete, compressed and puberulous at the extremities. Leaves oval, narrowly acuminate, wedge-shaped at the base, firmly chartaceous, glabrate or scattered with hairs on the midrib, $2\frac{1}{2}$–5 by 1–2 in., margin nearly flat, lateral veins about 6 pairs, often with little glandular pits in the axils; petiole $\frac{1}{5}$–$\frac{2}{5}$ in.; stipules long-sheathing, with two or more filiform tails terminating each, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Flowers about $\frac{1}{3}$ in. long, sessile, numerous, in brachiately branched terminal cymes of 2 in. diam. with two opposite leaves or leaf-like bracts which bear deltoid stipules; common peduncle (or uppermost internode) $\frac{3}{4}$ in.; bracteoles ovate, about equalling the calyx. Calyx-limb larger than the ovary, glabrate, unequally 5–4-cleft; teeth ovate. Corolla white, sweet-scented; tube straight; throat bearded; lobes 5–4, longer than the tube. Anthers 5–4, about equalling the filaments. Style bidentate.

North Central. Monbuttu-land, at the River Kapili, *Schweinfurth!*

19. **P. gabonica,** *Hiern.* A glabrous shrub. Branches terete, smooth, rather compressed towards the extremities. Leaves oval, shortly acuminate, attenuate at the base into a petiole of $\frac{1}{2}$–1 in.,

firmly chartaceous, of nearly the same colour on both surfaces, 3–9 by $1\frac{1}{6}$–4 in., margins narrowly revolute, lateral veins about 8–10 pairs, conspicuous beneath; stipules deltoid, undivided, apiculate, glabrous, small, caducous. Flowers pentamerous, about $\frac{1}{8}$ in. long or rather more, on very short pedicels, many together in dense subglobose ebracteate subsessile terminal panicles of 1 in. or more diam., laxer and larger in fruit. Calyx-limb hemispherical, about as long as the ovary, subtruncate, minutely ciliate. Corolla-lobes 5. Disk fleshy. Berries fleshy, ovoid, nearly $\frac{1}{2}$ in. long.

Upper Guinea. Near the Gaboon River, *Mann!*

The following specimens differ from the type of this species and may perhaps prove to be distinct:—

(1) Flowers $\frac{1}{4}$ in. long; panicles 2 in. diam. in flower, 4 in. diam. in fruit; berries crowned by a persistent calyx-limb.

Cameroon Mountains, at 2–3,000 feet elevation, *Mann!* a shrub, 6–8 feet high.

(2) Berries about 1 in. long; leaves rather abruptly wedge-shaped at the base; lateral veins less conspicuous; corolla red.

Sierra del Crystal, *Mann!* a shrub, 8 feet high.

(3) Corolla white or pale yellow, slightly curved.

Niger Expedition, at Eppah, *Barter!* and at Onitsha, *Barter!*

(4) Panicles pedunculate, peduncle $\frac{2}{3}$–$\frac{3}{4}$ in. long.

Gaboon River, *Mann!*

20. **P. arborea,** *Hiern.* A small nearly glabrous tree, not shrubby. Branches terete, towards the extremities compressed. Leaves elliptical, narrowed at both ends, glabrous, thinly coriaceous, of nearly the same colour on both surfaces, 8–14 by 3–5 in., margins narrowly revolute; petiole $\frac{2}{3}$–$1\frac{1}{2}$ in. long; lateral veins about 12 pairs; stipules caducous . . . . Flowers $\frac{1}{5}$ in. long, on short pedicels, in rather dense hemispherical branched terminal shortly pedunculate puberulous cymes of 2 in. diam.; common peduncle $\frac{1}{4}$ in. long; bracts and bracteoles minute or obsolete. Calyx green; limb hemispherical, as long as the ovary, entire, glabrous. Corolla white; tube funnel-shaped; limb 5–6-lobed; throat bearded. Anthers exserted. Style bifid above.

Upper Guinea. Old Calabar, *Rev. W. C. Thomson!*

21. **P. sciadephora,** *Hiern.* A nearly glabrous shining shrub, 3–10 feet high. Branches smooth, terete, compressed towards the extremities. Leaves narrowly elliptical, acuminate, wedge-shaped at the base, membranous, of the same colour on both surfaces, 4–7 by 1–$2\frac{1}{2}$ in., margins narrowly and subrepandly revolute; lateral veins about 8 pairs, slender; petiole $\frac{1}{5}$–$\frac{1}{4}$ in.; stipules depresso-deltoid, undivided, apiculate, $\frac{1}{6}$ in. long, shaggy inside, deciduous; the young shoots also sheathed at the base by scales which are shaggy inside like the stipules. Flowers pentamerous, on short pedicels, in dense small clusters arranged in sessile or subsessile terminal umbels of about 1–$1\frac{1}{2}$ in. diam.; bracts obsolete. Calyx brown; limb longer than the ovary, shortly 5-fid; lobes recurving, ovate. Corolla brown, very short; throat bearded. Berries oval, $\frac{1}{3}$ in. long; albumen of the seeds uniform, horny.

Upper Guinea. Cameroon Mountains, at elevation of 4,000 feet, *Mann!* Ambas Bay, *Mann!*

22. **P. punctata,** *Vatke in Oesterr. Bot. Zeitschr.* xxv. p. 230 (1875). Glabrous glaucescent. Branches pallid, subterete, at the extremities compressed. Leaves opposite, narrowly elliptical, somewhat obovate, rounded or obtuse at the apex, attenuate at the base, chartaceous, rather paler beneath, punctate, 1–3 by $\frac{1}{2}$–$1\frac{1}{2}$ in., margins narrowly revolute; lateral veins about 5 pairs, inconspicuous; petioles ranging up to $\frac{3}{4}$ in.; stipules deltoid, apiculate, undivided, caducous. Flowers pentamerous, $\frac{1}{6}$ in. long, on shorter pedicels, forming little clusters arranged in brachiately branched terminal or quasi-axillary pedunculate often drooping cymes; common peduncle 1–2 in.; bracts and bracteoles minute, obsolete. Calyx-limb about as long as the ovary, sinuate-denticulate. Corolla-tube funnel-shaped, straight; throat hairy. Anthers included. Style exserted; branches short, recurving. Berries depresso-globose or subdidymous, $\frac{1}{6}$–$\frac{3}{16}$ in. long, faintly ribbed; albumen of the seeds uniform.

Mozamb. Distr. Zanzibar, *Kirk;* Nazimoio, *Kirk! Hildebrandt!*
Vatke describes the leaves as verticillate in fours.

23. **P. obtusifolia,** *Poir. Encycl. Méth.* v. p. 697 (1804). Glabrous. Branches terete, opposite, finely striate, robust. Leaves obovate, rounded at the apex, attenuate at the base into a short petiole, thickly coriaceous, of the same colour on both surfaces, 3–5 by $1\frac{1}{3}$–2 in., lateral veins inconspicuous, about 5 pairs; margins revolute; stipules deltoid, apiculate, undivided, solitary, $\frac{1}{8}$–$\frac{1}{6}$ in. long, caducous. Flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, numerous, in dense pedunculate corymbose terminal panicles of about $1\frac{1}{2}$ in. diam.; bracteoles obsolete or minute; common peduncle 1–$1\frac{1}{4}$ in. Calyx-limb small, very shortly 5-dentate, not ciliate. Corolla-lobes ovate. Anthers shortly oblong, exserted. Fruit oval, about $\frac{1}{6}$ in. long, ribbed, 2-celled; seeds striate.—Lam. Ill. t. 161, f. 4; DC. Prodr. iv. p. 519; nec Sieber, nec E. Mey.

Mozamb. Distr. Mozambique, *Forbes!*
Occurs also in Madagascar.

24. **P. zambesiana,** *Hiern.* A nearly glabrous shrub, turning a dark colour in the dry state. Leaves opposite, obovate or narrowly elliptical, rounded or shortly pointed at the apex, wedge-shaped at the base, thinly coriaceous, inconspicuously punctate, glabrous, $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–2 in., margins narrowly revolute, lateral veins about 7 pairs; petioles ranging up to $\frac{1}{2}$ in.; stipules deltoid, shortly apiculate, $\frac{1}{6}$ in. long, caducous, undivided. Flowers pentamerous, $\frac{1}{6}$ in. long, on shorter pedicels, in trichotomously branched pedunculate terminal or subterminal subcorymbose cymes of $1\frac{1}{2}$–$2\frac{1}{2}$ in. diameter; common peduncle 1–2 in. long, erect; bracts and bracteoles minute or obsolete. Calyx-limb as long as the ovary; teeth short, ciliate. Corolla-tube funnel-shaped, straight; throat bearded. Anthers nearly included. Style exserted, bifid.

Mozamb. Distr. Kongone mouth of the Zambesi River, *Kirk!*

25. **P. Kolly,** *Schum. Beskr. Guin. Plant.* p. 130. Glabrous, shrubby. Branches subdichotomous, subdivaricate, terete, above compressed and dark purplish. Leaves ovate-elliptical, attenuate at both

ends, venose, shortly petiolate, green on both sides, in the dry specimens dark green above pale green below, 1–1½ in. long; stipules interpetiolar, ovate, acute, persistent, ⅙ in. long. Corymbs fastigiate, axillary and terminal; peduncles bifid, many flowered; bracts sublanceolate, acute, minute, at the forks, dark purplish. Calyx minute, obsoletely or obtusely 5-toothed. Corolla tubular; tube cylindrical, rather curved inwards, nearly ¼ in. long; lobes 5, ovate, rather acute.

Upper Guinea. Guinea, according to Schumacher, where the natives call it "Kolly-tjo."

In the British Museum there is a specimen from Cape Coast collected by Brass, which agrees with the above description except that the leaves are scarcely venose, the stipules are mostly deciduous, the corymbs are terminal (1 in. diam.) and trichotomously branched.

26. **P. Benthamiana,** *Hiern.* A glabrous shining shrub of moderate size. Branches weak, terete, towards the extremities compressed. Leaves elliptical, subacuminate, wedge-shaped at the base, chartaceous, 2–3 by ⅔–1¼ in., margins very narrowly revolute, lateral veins about 6 pairs, inconspicuous; petiole ⅙–⅜ in. long; stipules short, ovate, connate at the base, apiculate, undivided, ⅒–⅛ in. long. Flowers pentamerous, about ⅙ in. long, crowded in trichotomously branched terminal or subterminal pedunculate corymbose cymes of about 1 in. diameter; common peduncle about 1 in. long; bracts minute or obsolete or occasionally one foliaceous pair present. Calyx-limb very short, truncate. Berry (immature) globose, smooth, ⅙ in. diameter, green.—*Chasalia parviflora*, Benth. in Hook. Niger Fl. 417.

Upper Guinea. Fernando Po, *Th. Vogel!*

27. **P. owariensis,** *A. L. Juss. in Mém. Mus. Par.* vi. p. 379 (1820). A small glabrous tree. Leaves opposite, ovate-oblong, attenuate at both ends, shortly petiolate, 3–7 by 1–2¼ in., lateral veins about 13–14 pairs; stipules caducous, undivided? Flowers ¼ in. long, white; pedicels 2–3-flowered; corymbs terminal, 2–2½ in. diameter, rather lax; bracteoles subulate. Calyx-limb 5-dentate. Corolla narrowly funnel-shaped; limb 5-partite, reflexed. Stamens 5. Berry rough, ¼ in. long or rather more, ribbed.—*Hylacium owariense*, Palisot de Beauv. Fl. Ow. ii. 84, t. 113.

Upper Guinea. Deserts in the interior of the kingdom of Warree, *Beauvois.*

A specimen with chartaceous shining leaves and terete branches compressed above, may belong to this species; it was gathered by Mann in the island of Fernando Po.

28. **P. Brassii,** *Hiern.* Glabrous. Branches dark green in the dry state, compressed and subherbaceous at the extremities, somewhat constricted at the nodes. Leaves elliptical, acuminate, wedge-shaped at the base, thinly chartaceous, dark green above, rather paler and glistening beneath, 3½–7 by 1½–2⅔ in., margins nearly flat, lateral veins about 10 pairs, slender, tertiary veins slender, rather conspicuous beneath; petiole about ¾ in.; stipules ovate, apiculate, ⅕ in. long, apparently entire. Flowers on very short pedicels, several together, in little clusters on terminal (and subterminal) trichotomous subcorymbose

pedunculate panicles of about 1–2 in. diameter; bracts obsolete; peduncle $1\frac{1}{4}$–$1\frac{2}{3}$ in. Calyx $\frac{1}{8}$ in. long; limb cup-shaped, longer than the ovary, shortly 5-lobed. Fruit thickly ovoid, ribbed, $\frac{3}{8}$ in. long, crowned by the persistent calyx-limb.

Upper Guinea. Cape Coast, *Brass!*

29. **P. Afzelii,** *Hiern.* A glabrous shining shrub. Branches terete, brachiate. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, rather paler beneath, 2–6 by $\frac{2}{3}$–$2\frac{1}{2}$ in., margins revolute, lateral veins about 6–8 pairs; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules broad, undivided, short. Flowers 5–6-merous, $\frac{1}{4}$–$\frac{3}{8}$ in. long, on very short pedicels, in dense short terminal corymbose panicles of 1–3 in. diameter; common peduncle short; bracts and bracteoles small. Calyx-limb short, with 4–6 erect small or minute teeth. Corolla whitish; limb curved or straight, lobes 5–6; throat hairy. Stamens 5–6; filaments short, hyaline; anthers erect, yellowish, about as long as the corolla-lobes. Style subpubescent or glabrous; stigmas 2, pale yellow, pubescent or glabrous. Berry $\frac{1}{4}$–$\frac{1}{3}$ in. long, ribbed.

Upper Guinea. Sierra Leone, *Afzelius!* Bagroo River, *Mann!* Brass, *Barter!* Onitsha, *Barter!*

30. **P. cristata,** *Hiern.* Quite glabrous except the inflorescence, shrubby. Branches smooth. Leaves oval or elliptical, acuminate, somewhat wedge-shaped at the base, chartaceous, shining on both sides, rather paler beneath, $3\frac{1}{2}$–7 by $1\frac{1}{4}$–$3\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 7 pairs, rather slender; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules short, cleft? Flowers about $\frac{1}{5}$ in. long, pentamerous, very shortly pedicellate, in dense corymbose terminal sessile trichotomous puberulous cymes of $1\frac{1}{2}$–3 in. diameter; bracts and bracteoles very small. Calyx-limb shorter than the ovary, not broader than it, short dentate. Corolla white; tube subcylindrical; throat yellow, naked; lobes 5, spreading, keeled and crested at the back. Anthers linear, partly exserted. Style scarcely lobed, included.

Nile Land. Niamniam-land, *Schweinfurth!*
North Central. Near Munsa, *Schweinfurth!*

31. **P. abrupta,** *Hiern.* A small nearly glabrate shrub. Branches subterete, covered with pale corky bark, the branchlets abruptly narrower, somewhat angular. Leaves elliptical, narrowed at both ends, glabrous, chartaceous, 2–7 by $\frac{3}{4}$–3 in., those at the time of flowering young and many smaller; margins nearly flat, lateral veins about 7 pairs, slender; petioles ranging up to $\frac{3}{4}$ in. or subobsolete by the decurrence of the leaves; stipules ovate, undivided, $\frac{1}{8}$ in. long. Flowers about $\frac{1}{6}$ in. long, on very short pedicels, several together, in small terminal heads; bracteoles minute; common peduncles solitary, erect, very short in flower, lengthening in fruit and sometimes attaining $1\frac{1}{2}$ in. long. Calyx-limb short, broad, subtruncate, glabrescent. Corolla-lobes 5; throat bearded. Stamens exserted, filaments longer than the linear-oblong anthers. Style short, bifid at the apex. Berry ribbed, $\frac{1}{4}$ in. long, crowned by the persistent calyx-limb.

Mozamb. Distr. Zambesi-land, Shiramba Dembe and Shigogo, *Kirk!*

32. **P. anetoclada,** *Hiern.* A glabrous shrub, with smooth terete lax slender branches, compressed only at the extremities. Leaves elliptical, acuminate, wedge-shaped at the base, chartaceous, shining, 3–6 by 1–2 in., lateral veins about 8 pairs, slender, margins very narrowly revolute; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in., stipules deltoid, undivided, apiculate, about $\frac{1}{8}$ in. long. Flowers short, on shorter pedicels, many together in terminal umbellate ebracteolate heads of about $\frac{1}{3}$–$\frac{1}{2}$ in. diameter; common peduncles solitary, $\frac{1}{4}$–$\frac{3}{8}$ in. long, erect. Calyx-limb larger than the ovary, hemispherical, subentire. Corolla-lobes 5; throat bearded. Anthers apparently included.

Upper Guinea. Mount John River, Kongui, 1° N. Lat., *Mann!*

33. **P. Kirkii,** *Hiern.* A shortly pubescent shrub. Branches glabrate, terete, turning a dull reddish colour, the branchlets shortly pubescent, compressed towards the extremities. Leaves elliptic-obovate, obtuse, shortly pointed or mucronulate, membranous, scattered with short hairs especially on the midrib and 5–6 pairs of lateral veins beneath, 1–4 by $\frac{1}{3}$–$1\frac{1}{3}$ in., attenuate at the base into the short petiole, margins nearly flat; stipules ovate, bicuspidate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers dimorphic, $\frac{1}{5}$–$\frac{1}{4}$ in. long, glabrous, shortly pedicellate or subsessile, many together, in dense capitate cymes of $\frac{1}{2}$–$\frac{3}{4}$ in. diameter; bracteoles minute or absent; common peduncle solitary or two together, shortly pubescent, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, terminal, occasionally overtopped by the lateral opposing branch. Calyx-tube about as long as the ovary, broader, shortly and unequally toothed. Corolla-tube straight; lobes 5. Anthers exserted in some plants, included in others, corresponding with the included or exserted style.

Moxamb. Distr. Near Moramballa, at elevation of 1000 ft., *Kirk!*

34. **P. recurva,** *Hiern.* A small glabrous shining leafy shrub, 4–5 ft. high. Branches subterete except the angular or compressed subherbaceous extremities. Leaves lanceolate or narrowly elliptical, attenuate at both ends, chartaceous, 2–5 by $\frac{1}{3}$–$1\frac{1}{6}$ in., lateral veins about 6 pairs, very slender; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules bicuspidate from a short broad base, about $\frac{1}{8}$ in. long, cusps diverging, recurved. Flowers about $\frac{1}{8}$ in. long before expansion, shortly pedicellate, several (about 8–9) together in small pedunculate terminal subcapitate clusters; common peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long, erect, solitary. Calyx-limb shortly hemispherical, broader than the ovary; teeth very small. Corolla thin; lobes 5; throat bearded. Anthers 5, about double the length of the filaments. Style bidentate.

Upper Guinea. Fernando Po, *Mann!*

35. **P. subobliqua,** *Hiern.* A small nearly glabrous shrub, 3–4 feet high. Branches smooth, terete, at the extremities compressed. Leaves elliptic-obovate, acuminate, wedge-shaped at the base, glabrous, chartaceous, $2\frac{1}{2}$–$5\frac{1}{2}$ by $\frac{5}{8}$–$1\frac{3}{4}$ in., margins very narrowly revolute, lateral veins about 7 pairs, slender; petiole $\frac{1}{8}$–$\frac{3}{8}$ in. long; stipules ovate, bidentate, puberulous outside near the base, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Flowers

about $\frac{1}{7}$ in. long when expanded, glabrous outside, on short pedicels, many together, forming small terminal umbellate heads of $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, ebracteolate; common peduncles solitary, $\frac{1}{5}$–$\frac{3}{5}$ in. long. Calyx-limb rather larger than the ovary, spreading, rather oblique, 5-cleft; lobes rounded. Corolla straight; tube short; throat bearded; lobes reflexed, ovate, thinly pubescent about the base, rather shorter than the tube. Anthers partly included. Style exserted, bifid at the apex.

Upper Guinea. Fernando Po, *Mann!*

A specimen from Prince's Island, collected by Mann, with rather wider oval leaves and more patent lateral veins, probably belongs to this species.

36. **P. pumila,** *Hiern.* A diminutive shrub, under a foot high, nearly simple, subglabrous. Stem subterete, somewhat compressed towards the apex. Leaves broadly ovate or oval, obtuse, apiculate or mucronulate, narrowed at the base, decurrent and undulated towards the obsolete petiole, chartaceous, $2\frac{1}{2}$–$3\frac{1}{4}$ by $1\frac{1}{2}$–$2\frac{1}{4}$ in., margin narrowly revolute, lateral veins about 6–7 pairs, slender; stipules ovate, bicuspidate-cleft, $\frac{3}{8}$ in. long, cusps filiform. Flowers small, numerous, on very short pedicels, in terminal ebracteolate umbellate heads of $\frac{2}{5}$ in. diameter; common peduncles solitary, about $\frac{1}{2}$ in. long, erect. Calyx turbinate; limb campanulate, shortly 5-cleft; teeth ovate, rather unequal, recurved towards the tip. Corolla-lobes 5; throat bearded. Anthers linear; filaments short. Style bidentate.

Mozamb. Distr. Near Moramballa, *Kirk!*

37. **P. nigropunctata,** *Hiern.* Glabrous, shrubby? Branches smooth, subterete, somewhat compressed at the extremities. Leaves narrowly elliptical, narrowed at both ends, chartaceous, black-punctate, 2–3 by $\frac{3}{4}$–$\frac{7}{8}$ in., margins very narrowly revolute, lateral veins about 7–8 pairs, slender, inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules deeply bilobed, $\frac{1}{4}$ in. long, segments subulate-acute from an ovate or lanceolate base. Flowers several together, on pedicels of $\frac{1}{12}$–$\frac{1}{10}$ in. which in fruit lengthen to about double, umbellately arranged in terminal and subterminal pedunculate clusters; common peduncle about 1–$1\frac{1}{4}$ in. long; bracts and bracteoles absent or minute. Calyx urceolate; limb short, deeply lobed, teeth 5, lanceolate-subulate, recurving. Corolla not known. Fruit $\frac{1}{5}$–$\frac{1}{4}$ in. diameter, indistinctly ribbed; albumen of the seeds uniform.

Lower Guinea. Congo, *Chr. Smith!*

38. **P. bracteosa,** *Hiern.* Pubescent at the extremities. Branchlets compressed above. Leaves oval, narrowly acuminate, attenuate at the base, glabrate above, silky-pubescent beneath, firmly chartaceous, of about the same colour on the two surfaces, about a foot long, $4\frac{1}{2}$–5 in. wide, margins narrowly revolute, lateral veins about 30 pairs, not conspicuous; petiole 2–$2\frac{1}{2}$ in., silky-pubescent; stipules ample bipartite; segments ovate, acuminate, $1\frac{1}{2}$–2 in. long, silky-pubescent, ciliate. Flowers pentamerous, about $\frac{2}{3}$ in. long, many together, in dense terminal sessile bracteate silky-pubescent clusters of about 3 in. diameter;

bracts and bracteoles lanceolate, mostly exceeding the calyx. Calyx about $\frac{3}{8}$ in. long, silky-pubescent; limb unequally 5-partite, segments lanceolate. Corolla-lobes ciliate towards the top at the back; tube rather curved; throat bearded. Anthers included. Ovary small, ovules compressed.

Upper Guinea. Gaboon River, *Mann!*

39. **P. globosa,** *Hiern.* A small shrub of 3 feet. Branchlets somewhat sulcate, and at the extremities compressed, puberulous at the nodes. Leaves oval, subacuminate, narrowed to an obtuse base, glabrate, thinly coriaceous, about $4\frac{1}{2}$ by $2\frac{1}{4}$ in., margins narrowly revolute, lateral veins spreading, about 15 pairs; petiole about $\frac{1}{5}$ in.; stipules oval, puberulous, tricuspidate, loosely sheathing below, $\frac{2}{3}$ in. long. Flowers (unexpanded) $\frac{2}{5}$ in. long, sessile, numerous, densely packed in terminal sessile bracteate heads of about 1 in. diameter; bracts linear-lanceolate, ciliate, unequal, some about equalling the flower. Calyx-limb about $\frac{1}{3}$ in. long, deeply and unequally 5-lobed; segments like the bracteoles. Corolla-limb globose in bud, $\frac{1}{5}$–$\frac{1}{4}$ in. diameter, puberulous on both surfaces, usually 5-lobed; lobes obtuse. Anthers linear-oblong, about double the length of the filaments. Style bifid at the tip.

Upper Guinea. Ambas Bay, *Mann!*

40. **P. insidens,** *Hiern.* A nearly glabrous under-shrub, 1–2 feet high. Branches terete, with pale bark; young shoots herbaceous, puberulous. Leaves oval, shortly acuminate, wedge-shaped at the base, subglabrescent, chartaceous, 3–5 by $\frac{3}{4}$–2 in., margins narrowly revolute, lateral veins about 7 pairs, slender, tertiary veins at length clearly marked beneath; petiole $\frac{1}{6}$–$\frac{3}{4}$ in., puberulous; stipules ovate, undivided, puberulous. Flowers pentamerous, $\frac{1}{5}$–$\frac{1}{4}$ in. long, on very short puberulous pedicels, umbellately arranged in dense terminal sessile or subsessile clusters of $\frac{2}{3}$–$\frac{3}{4}$ in. diameter which are bracteate at the base. Calyx green, puberulous; limb exceeding the ovary, hemispherical with 5 very small teeth which are pale in the dry state. Corolla white; tube cylindrical, densely bearded inside. Anthers linear, included; filaments short. Style bidentate, shortly exserted.

Upper Guinea. Fernando Po, at elevation of 1000 ft., *Mann!*

41. **P. subherbacea,** *Hiern.* A nearly glabrous shrub, with terete subherbaceous branches somewhat compressed at the extremities. Leaves elliptical, subacuminate, attenuate at the base, thinly chartaceous, of the same colour on both surfaces, 4–6 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., margins narrowly revolute, lateral veins about 8–10 pairs, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules deltoid, subapiculate, $\frac{1}{8}$–$\frac{1}{4}$ in. long, undivided. Flowers pentamerous, nearly $\frac{1}{4}$ in. long, straight, sessile or subsessile, crowded many together in very shortly pedunculate terminal capitate cymes of $\frac{1}{2}$ in. diameter; bracts subulate, small; bracteoles minute. Calyx glabrous; limb about as long as the ovary, 5-cleft. Corolla-tube subcylindrical; throat thinly bearded. Anthers probably exserted in full flower. Style included.

Upper Guinea. Fernando Po, *Mann!*

42. **P. infundibularis,** *Hiern.* A glabrous shrub, about 4 feet high. Branches terete, the young shoots with 2 raised lines. Leaves oval, rather abruptly acuminate, wedge-shaped at the base, chartaceous, of nearly the same colour on both surfaces, $2\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{2}{3}$–2 in., margins narrowly revolute, lateral veins about 5–6 pairs, slender; petiole $\frac{1}{5}$–$\frac{1}{3}$ in.; stipules lanceolate or ovate, connate or sheathing below, about $\frac{1}{4}$ in. long, apparently bidentate at the apex. Flowers about $\frac{1}{3}$ in. long when expanded, pentamerous, sessile, numerous, in terminal subsessile crowded clusters of about $\frac{1}{2}$–$\frac{2}{3}$ in. diameter; bracts ovate, usually bifid with subulate lobes. Calyx-limb shorter than the ovary, with 5 very small teeth. Corolla yellow; tube funnel-shaped, thinly pubescent inside, straight. Anthers 5, apparently included; filaments two-thirds of the length of the anthers. Style glabrous, included, shortly bifid.

Upper Guinea. Sierra del Crystal, *Mann!*

43. **P. subnuda,** *Hiern.* A glabrous shrub, 4–6 feet high. Branches smooth, terete. Leaves oval, abruptly acuminate, attenuate at the base, membranous, of the same colour on both surfaces, $2\frac{1}{2}$–6 by 1–3 in., margins very narrowly revolute, lateral veins about 7–9 pairs, slender; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules ovate, small, minutely bidentate. Flowers pentamerous, nearly $\frac{1}{4}$ in. long, sessile or subsessile, numerous, in dense shortly pedunculate heads of about $\frac{1}{2}$ in. diameter; common peduncle $\frac{1}{8}$–$\frac{3}{8}$ in.; bracts like the stipules or dentate, upper ones smaller. Calyx-limb as long as the ovary, with 5 small ovate teeth. Corolla-throat nearly naked. Anthers cohering in the bud. Style scarcely lobed. Fruit bisulcate, indistinctly ribbed, $\frac{1}{4}$ in. long or rather more; seeds with a broad excavation on the face.

Upper Guinea. Old Calabar River, *Mann!*

44. **P. longistylis,** *Hiern.* A small shrub, glabrous except the inflorescence. Branches terete, pale. Leaves oval, subacuminate, more or less wedge-shaped at the base, chartaceous, shining, of nearly the same pale green colour on both surfaces, $2\frac{1}{2}$–5 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 6 pairs, slender; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules ovate, subapiculate, undivided, about $\frac{1}{8}$ in. long. Flowers $\frac{1}{4}$ in. long when expanded exclusive of the exserted style, sessile or subsessile, pentamerous, several together, in terminal bracteate sessile or subsessile heads $\frac{1}{2}$ in. long; bracts numerous, puberulous, the outer ones imbricated, ovate, like the stipules, the inner ones more subulate, irregularly scattered. Calyx puberulous; limb rather shorter than the ovary, shortly lobed. Corolla-tube subcylindrical, straight; lobes very thinly pubescent inside; throat bearded. Anthers well included. Style well exserted, branches short, arching outwards.

Upper Guinea. River Gaboon, *Mann!*

45. **P. bidentata,** *Hiern.* A glabrate climbing shrub or bushy tree. Branches subterete with greyish bark, at the extremities more or less angular or compressed. Leaves elliptical, acutely acuminate or

subcuspidate, wedge-shaped at the base, thinly coriaceous, 3–8 by 1–3 in., margins recurved, lateral veins about 12–14 pairs, rather patent and curved; petiole $\frac{1}{6}$–1 in.; stipules broadly ovate, wavy, $\frac{3}{8}$–$\frac{2}{3}$ in. long, connate at the base, bifid, deciduous. Flowers sessile or subsessile, capitate, many together; bracteoles equalling or shorter than the calyx, dentate or tricuspidate, amongst the flowers; heads few together (or solitary), arranged in brachiately branched (or simple) pedunculate lateral and subterminal cymes; bracts like the stipules, at the base of the common pedicels of $\frac{1}{2}$–$1\frac{1}{2}$ in.; common peduncles 3–5 in., compressed. Calyx-limb cup-shaped, $\frac{1}{12}$ in. long; teeth 5, ciliate. Corolla white, $\frac{1}{4}$ in. long. Anthers 5, exserted. Style exserted. Berry $\frac{1}{4}$ in. long, 10-ribbed, shortly pedicellate.—*Cephaëlis bidentata*, Thunb. ex Roem. et Schult. Syst. Veg. v. p. 214; Benth. in Hook. Niger Fl. 421 *ex parte*.

Upper Guinea. Sierra Leone, *Afzelius!* and others; Grand Bassa, *Th. Vogel!*

46. **P. Vogeliana,** *Benth. in Hook. Niger Fl.* 420. A shrub, 3–15 feet high. Branches subterete, glabrate, towards the extremities pubescent and more or less compressed. Leaves oval, subacuminate or cuspidate, wedge-shaped or obtuse at the base, thinly coriaceous, glabrate above, puberulous beneath at least on the midrib or the 14–16 pairs of lateral veins, 3–9 by 1–4 in., margins flat or nearly so; petiole $\frac{1}{6}$–1 in.; stipules ovate, bifid or crimped. Flowers several together, sessile, capitate; bracteoles small, mostly bidentate; heads rather small, numerous, arranged in axillary subterminal corymbosely branched puberulous cymes; bracts like the stipules; common peduncles 1–3 in. Calyx-limb cup-shaped; teeth 5, ciliolate. Corolla white, 5-lobed. Anthers 5, exserted. Style exserted. Berries $\frac{1}{4}$ in. long, 10-ribbed.

Upper Guinea. On the Quorra, at Abòh, *Th. Vogel!* Niger Expedition, at Onitsha, *Barter!* bank of the Nun River, *Mann!*

47. **P. latistipula,** *Benth. in Hook. Niger Fl.* 419. A shrub of 5–6 feet or a small tree. Branches subterete, glabrate, at the extremities somewhat herbaceous and compressed, puberulous. Leaves elliptical or oval, acuminate, wedge-shaped at the base, nearly glabrous or puberulous on the veins beneath, chartaceous, paler beneath, 4–8 by $1\frac{1}{2}$–4 in., margins recurved or nearly flat, lateral veins about 20 pairs; petiole $\frac{1}{5}$–$\frac{3}{4}$ in.; stipules oval or subrotund, bifid or cut, fimbriate-ciliate, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Flowers shortly pedicellate, subcapitate, several together; bracteoles small at the base of the puberulous pedicels which equal or exceed the flowers; heads small, numerous, in axillary divaricately branched ample cymes; bracts like the stipules but narrower; common peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in. Calyx-tube cup-shaped, longer than the ovary; teeth 5, very short, ciliolate. Corolla-buds puberulous outside; throat bearded. Anthers 5. Style bidentate. Berry subglobose, $\frac{1}{5}$ in. diameter, 10-ribbed.

Upper Guinea. Fernando Po, *Mann! Th. Vogel!*

48. **P. Schweinfurthii,** *Hiern.* Shrubby, creeping; young parts shortly pubescent. Leaves oval or elliptical, acuminate, wedge-shaped at the base, chartaceous, glabrous and shining above, puberulous

along the midrib and paler beneath, 4½–5½ by 1¼–2¼ in., margins very narrowly revolute, lateral veins about 13 pairs, rather slender; petiole ⅙–¼ in. long; stipules broad, ½–⅔ in. long, connate below, apiculate or cut, ciliate, hairy outside near the base. Flowers ⅕–¼ in. long, on short pedicels, crowded several together, in hemispherical terminal pedunculate bracteate panicles, pentamerous; common peduncle about 2½ in., shortly pubescent, rather slender, erect; bracts narrowly elliptical, ½–⅝ in. long, somewhat dentate. Calyx-limb as long as the ovary, shortly cleft; teeth often ciliate at the tip. Corolla funnel-shaped, straight; throat thinly pubescent; lobes thickened at the back near the tip. Anthers exserted. Style bifid with spreading branches.

Nile Land. Niamniam-land, *Schweinfurth!*

49. **P. lucens,** *Hiern.* A glabrous shining shrub. Branches compressed towards the extremities. Leaves oval, acuminate, wedge-shaped at the base, thinly chartaceous, paler beneath, 6–8 by 2⅓–4 in., margins very narrowly revolute, lateral veins about 13–14 pairs, slender, clearly marked beneath; petiole ½–1 in.; stipules oval-oblong, glabrous, shortly bifid, ½ in. long. Flowers tetramerous, about ⅙ in. long, on short pedicels, numerous, in terminal rather lax rounded pedunculate bracteate panicles of about 3 in. diam.; common peduncle 1½–2¼ in. long; primary branches about 5, umbellate; bracts lanceolate, taper-pointed, about ⅙ in. long. Calyx-limb as long as the ovary, shortly cleft. Corolla deeply lobed; throat bearded.

Upper Guinea. Prince's Island, *Barter!*

50. **P. reptans,** *Benth. in Hook. Niger Fl.* 418. A small climbing or procumbent shrub. Branches subterete, glabrescent, towards the extremities hirsute-puberulous subrufous more or less compressed. Leaves elliptical, acuminate, wedge-shaped or occasionally subobtuse at the base, glabrate above, rather paler and puberulous beneath at least along the midrib and 12–18 pairs of lateral veins, chartaceous, 1½–5 by ½–2 in., margins very narrowly revolute; petioles ranging up to ¼ in., hirsute puberulous; stipules deeply bifid, ⅜–½ in. long, deciduous, lobes lanceolate, acute, ciliate, arising from the dilated base of the stipule. Flowers about ⅕ in. long, dimorphic, sessile or subsessile, a few or several together in little heads arranged in axillary and subterminal divaricately branched bracteate hirsute-puberulous panicles; bracts ⅛–¼ in. long, lanceolate; bracteoles smaller; common peduncle ¾–2 in. Calyx subcampanulate; limb rather exceeding the ovary, shortly 5-cleft; lobes deltoid, recurving at the tip. Corolla-tube straight or slightly curved; throat bearded; lobes 5, lanceolate, each furnished at the back near the apex with a short thick process which is conspicuous in the bud, reflexed in flower. Stamens 5, exserted or included, corresponding with the included or exserted style. Fruit ovoid-oblong, strongly ribbed, ⅙–⅕ in. long, crowned with the persistent calyx-limb.

Upper Guinea. Sierra Leone *Hb. Afzelius! Th. Vogel! G. Don!* Bagroo River, *Mann!* Cape Coast, *Brass!* (Anthers exserted).

51. **P. mucronata,** *Hiern.* A nearly glabrous undershrub, about 2–3 feet high, not much branched. Leaves oval or elliptical, not acu-

minate, usually mucronate, attenuate at the base, thinly chartaceous, glabrate above, puberulous along the midrib and paler beneath, scattered with small black points, 3–5½ by 1–1¾ in., margins narrowly revolute subrepand, lateral veins about 8–9 pairs not conspicuous; petiole ⅛–⅓ in.; stipules ovate, longer than the petiole, apiculate, bifid or bidentate, ¼–⅜ in. long. Flowers pentamerous, ¼–⅓ in. long, on short pedicels, several together, in rather dense corymbose or hemispherical axillary or quasi-axillary pedunculate cymes of 1½ in. diam.; common peduncle 1 in., "4-sided, sub-bialate" (Schweinf. mss. in Herb.); bracts and bracteoles caudate, hairy within. Calyx-limb shortly and irregularly 5–6-toothed, as long as the ovary; teeth short notched at the apex. Corolla white, sweet-scented like Elder (*Sambucus*); tube straight, subcylindrical; throat bearded; lobes 5, ovate-lanceolate. Anthers 5, exserted. Style glabrous, bidentate at the tip.

Nile Land. Djur-land, at Seriba Ghattas, *Schweinfurth!*

52. **P. stictophylla,** *Hiern.* A very nearly glabrous shrub, 4–5 feet high. Branches ashy. Leaves oval-oblong, acuminate, wedge-shaped at the base, firmly chartaceous, of nearly the same colour on both surfaces. 3½–5 by 1–1⅓ in., margins narrowly revolute, lateral veins about 6 pairs; stomata conspicuous, crowded amongst reddish resinous tissue; stipules lanceolate-acuminate from an ovate rigid base, undivided, ⅓ in. long. Occasionally pairs of smaller leaves ½–1¼ in. long, with sheathing stipules, intervene. Flowers pentamerous, about ⅛ in. long when expanded, subsessile, a few together in terminal bracteate pedunculate small brachiate cymes of about ½–¾ in.; common peduncle ¼–½ in. long; bracts ⅛–¼ in. long, accompanied by small bipartite stipules; bracteoles small, subulate. Calyx-limb as long as the ovary, with irregular subulate teeth. Corolla deeply 5-lobed: throat densely bearded. Style minutely hairy.

Upper Guinea. Sierra del Crystal, *Mann!*

53. **P. obscura,** *Benth. in Hook. Niger Fl.* 419. A nearly glabrescent scandent shrub. Branches smooth, terete, glabrate, towards the extremities compressed and puberulous. Leaves ovate-oval, subacuminate, obtuse or somewhat wedge-shaped at the base, glabrescent above, rather paler and puberulous at least along the midrib and 10 pairs of lateral veins beneath, chartaceous, 2–4 by ¾–1½ in.; petiole ⅛–⅙ in.; stipules bipartite, ⅜–½ in. long; segments lanceolate, bicuspidate at the tip. Flowers ¼ in. long when expanded, subsessile, white, in divaricately branched bracteate axillary subterminal pedunculate cymes; bracts like the stipule-segments, ⅜ in. long; bracteoles smaller; common peduncle 1½–2 in. long, puberulous. Calyx-limb small, shortly toothed. Corolla-tube slightly curved, double the length of the 5 lanceolate recurved lobes; throat bearded. Anthers 5, exserted on rather long filaments. Fruit ¼ in. long, red, 10-ribbed. Albumen of the seeds not ruminated.

Upper Guinea. At Accra, *Th. Vogel!*

54. **P. crispa,** *Hiern.* A nearly glabrous shrub, about 6 feet high. Branchlets somewhat angular or compressed and sulcate, sub-

herbaceous. Leaves elliptical, narrowly acuminate, wedge-shaped at the base, chartaceous, glabrate above, obsoletely puberulous along the midrib and the 20 pairs of lateral veins, 4–7 by $1\frac{2}{3}$–$2\frac{2}{3}$ in., margins nearly flat; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules obovate-rotund, cut, $\frac{4}{5}$ in. long, deciduous; margins crimped, fimbriate-ciliate. Flowers small, shortly pedicellate, several together, subcapitate; bracteoles small; bracts like the stipules but narrower and not cut; heads small arranged in pedunculate divaricately branched ample axillary subterminal cymes; common peduncle about 4 in. Calyx-limb puberulous, very short; teeth 5, very short. Corolla-bud puberulous outside, 5-lobed; throat bearded. Style glabrous, bifid at the apex. Berry subglobose, $\frac{1}{5}$ in. diam.

Upper Guinea. Sierra del Crystal, 1° N. lat., *Mann!*

55. **P. trachystyla,** *Hiern.* A puberulous shrub, about 6 feet high. Branches terete, compressed towards the extremities. Leaves narrowly elliptical, acuminate, attenuate at the shortly petiolate base, chartaceous, glabrous except the hispidulous midrib beneath, of the same colour on both surfaces, spreading, 9–10 by 2–$2\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 9–10 pairs, tertiary veins transverse; stipules ovate-lanceolate, puberulous, connate below, bifid above, $\frac{1}{2}$–$\frac{3}{5}$ in. long. Flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, very shortly pedicellate, in small clusters arranged in brachiate bracteate apparently terminal pyramidal panicles of about 4 in. long; common peduncle about 1 in. long; bracts foliaceous, $\frac{1}{2}$–1 in. long; bracteoles smaller, subulate. Calyx puberulous; limb short, 5-toothed. Corolla straight, shortly 5-lobed. Anthers 5, included. Style subclavate, puberulous upwards, bidentate.

Upper Guinea. Mount John River, Kongui, 1° N. lat., *Mann!*

56. **P. Soyauxii,** *Hiern.* A small somewhat branched shrub, 2 feet high. Branches terete, pubescent towards the extremities. Leaves obovate-elliptic, acuminate, attenuate at the base into a short petiole, chartaceous, glabrous above, puberulous along the veins and rather paler beneath, 4–5 by $1\frac{1}{2}$–2 in., lateral veins about 10 pairs, slender; stipules $\frac{1}{2}$–$\frac{2}{3}$ in. long, bifid, ciliate, with bidentate lobes. Flowers pentamerous, $\frac{1}{4}$ in. long, several together, on very short pedicels crowded in solitary rather dense terminal pedunculate bracteate cymes of nearly 1 in. diam.; common peduncle $1\frac{1}{2}$ in. long, bifariously hairy; bracts narrowly elliptical, $\frac{1}{2}$ in. long, at the top of the peduncle. Calyx glabrous; limb shorter than the ovary; teeth short, recurving, Corolla glabrous outside, much exceeding the calyx; throat pubescent; lobes subcornuate at the back near the tip. Style short, bifid. Fruit red.

Lower Guinea. Loango, *Soyaux!*

57. **P. virens,** *Hiern.* A glabrous shining undershrub, 2–3 feet high. Branches terete, compressed and herbaceous above. Leaves narrowly elliptical or oblanceolate, acuminate, attenuate at the base, chartaceous, paler beneath, 5–9 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., margins very narrowly revolute, lateral veins about 10–12 pairs, slender, pale beneath; stipules

deltoid, apiculate, connate at the base, $\frac{1}{6}$–$\frac{1}{5}$ in. long, undivided. Flowers $\frac{3}{4}$ in. long, subsessile or shortly pedicellate, pentamerous, in dense globose terminal cymes of 1–$1\frac{1}{2}$ in. diam.; common peduncle very short; bracteoles lanceolate, about equalling the pedicels. Calyx-limb hemispherical, nearly as long as the ovary, 5-cleft. Corolla-tube more or less curved; throat pubescent; lobes 5, small. Anthers 5, well included.

Upper Guinea. Prince's Island, *Mann!*

58. **P. Ansellii,** *Hiern.* A glabrous, scandent, shining shrub. Branches rambling, terete, smooth. Leaves more or less elliptical, much acuminate, wedge-shaped at the base, chartaceous, 3–5 by $\frac{5}{6}$–$1\frac{5}{6}$ in., margins revolute, lateral veins about 7–8 pairs; petiole $\frac{1}{5}$–$\frac{2}{5}$ in.; stipules very short, depresso-deltoid, apiculate, caducous. Flowers $\frac{1}{2}$ in. long, on shorter pedicels, in rather lax or rather dense terminal trichotomous panicles; common peduncles ranging up to $1\frac{2}{3}$ in.; bracts and bracteoles very small. Calyx-limb small, with 5 small teeth. Corolla-tube slender, straight or somewhat curved; throat downy; lobes 5, short, reflexed. Anthers 5, partly exserted. Disk elevated. Style bifid at the apex.—*Chasalia? laxiflora,* Benth. in Hook. Niger Fl. 416.

Upper Guinea. Sierra Leone, *G. Don;* Grand Bassa, *Ansell!* "West Africa," *Adm. Grey;* Old Calabar (fl. crimson and yellow), *Rev. W. C. Thomson!*

59. **P. zanguebarica,** *Hiern.* A small glabrous lucid shrub. Branches terete, towards the extremities compressed. Leaves narrowly oval, not or scarcely acuminate, wedge-shaped or attenuate at the base, chartaceous, slightly paler beneath, $1\frac{1}{2}$–4 by $\frac{5}{8}$–$1\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 6–7 pairs; petiole $\frac{1}{12}$–$\frac{1}{2}$ in.; stipules short, broad, apiculate, undivided, leaving a deciduous ring of hairs inside. Flowers pentamerous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, subsessile or shortly pedicellate, few together in little clusters arranged in trichotomously branched corymbose or hemispherical pedunculate or sessile terminal cymes of 1–2 in. diam.; common peduncles ranging up to $\frac{3}{4}$ in.; bracts and bracteoles small. Calyx-limb shorter than the ovary, 5-cleft; teeth deltoid. Corolla-tube slender, rather curved. Berries ovoid-globose, $\frac{1}{4}$ in. long, bisulcate and faintly ribbed.

Mozamb. Distr. Bagamoyo and Monfia Island, Zanzibar Coast, *Kirk!* Rovuma Bay, 10° S. lat., *Kirk!*

60. **P. umbraticola,** *Vatke in Oesterr. Bot. Zeitschr.* xxv. p. 230 (1875), *sub* Chasaliâ. A glabrate leafy shining shrub, 6–7 feet high; branches strict, smooth, terete, somewhat compressed towards the extremities. Leaves oval, scarcely or shortly acuminate, wedge-shaped at the base, firmly chartaceous, rather paler beneath, 2–4 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., margins narrowly and subrepandly revolute, lateral veins about 5–6 pairs, slender; stipules very short, shortly apiculate, broad, undivided, leaving a ring of hair inside; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. Flowers nearly 1 in. long, congested, a few together, sessile, in hemispherical trichotomous pedunculate terminal cymes of 1–2 in. diam.; common peduncle

$\frac{1}{2}$–$1\frac{1}{2}$ in.; bracts minute or obsolete, or occasionally one foliaceous pair present. Calyx-limb small, subtruncate. Corolla white; tube slightly curved; lobes 5, spreading. Anthers exserted. Berry shortly ovoid, obscurely ribbed, black, $\frac{1}{6}$ in. long.

Mozamb. Distr. Zanzibar Island, *Hildebrandt!*

61. **P. nubica,** *Del. Pl. Mér.* p. 66 (1826). A shrub. Branches glabrescent. Leaves elliptical, narrowed at both ends, glabrous above, pubescent beneath on the rather prominent lateral veins, 3 in. long; petiole short, pubescent; stipules triangular. Flowers pentamerous, $\frac{1}{2}$ in. long, 3–6 together, forming little clusters arranged in trichotomously branched terminal convex cymes of nearly 4 in. diam. Calyx-limb short; teeth short, obtuse. Corolla pubescent outside; limb campanulate; lobes 5, half the length of the tube, pubescent on both sides. Stamens 5, inserted at the mouth of the corolla; anthers versatile. Style exserted by $\frac{1}{4}$–$\frac{1}{3}$ in.

Nile Land. Sennaar, near Singué, *Cailliaud.*

The description is taken from Delile; I have seen no specimen, and cannot feel sure that it has been assigned to the right genus.

UNKNOWN SPECIES.

Pyschotria angustifolia, G. Don, Gen. Syst. iii. p. 595, non Poir., an erect nearly simple shrub, with oval-lanceolate acuminate leaves, and terminal panicled pale red flowers, from Sierra Leone, on the banks of rivulets, is unknown to me. Mr. Bentham, in the Niger Flora, p. 421, suggests that it is probably a *Pavetta* or a *Tarenna.*

62. GRUMILEA, Gaertn. Fruct. i. p. 138, t. 28, f. 2 (1788).

Calyx-limb cup-shaped, shortly toothed, wider than the ovary, persistent. Corolla shortly tubular; throat hairy; lobes 5, ovate, reflexed in the flower, valvate in the bud, induplicately so towards the tip. Stamens 5, inserted at the throat of the corolla, partly exserted, glabrous; anthers linear, fixed at the back above the base; filaments about half the length of the anthers. Disk elevated, glabrous. Ovary 2-celled; style shortly exserted, bifid at the tip; ovules solitary, erect, somewhat compressed and coarsely wrinkled. Berry crowned by the calyx-limb, oval-oblong or subglobose, ribbed; pyrenes 2; pericarp coriaceous. Seeds solitary; albumen deeply ruminated. Embryo rather curved, small, dorsal; radicle inferior.—Shrubs with opposite leaves and branches, oblong or oval stipules and small congested or paniculate hermaphrodite flowers arranged in terminal cymes.

A genus of moderate size, apparently confined to the Old World.

Flowers capitate in solitary sessile heads . . . . . 1. *G. psychotrioides.*
Inflorescence paniculate, not capitate in solitary sessile heads.
  Stipules undivided.
    Calyx toothed or shortly lobed.
      Leaves succulent, coriaceous $5\frac{1}{2}$–7 in. long . . . 2. *G. succulenta.*
      Leaves chartaceous, 3–5 in. long . . . . . 3. *G. Kirkii.*
    Calyx truncate, subentire . . . . . 4. *G. macrocarpa.*

Stipules bidentate or cleft.
  Glabrous or very nearly so.
    Stipules bidentate. Flowers $\frac{1}{5}$ in. long. Calyx-limb as long as the ovary . . . . . 5. *G. venosa.*
    Stipules bifid. Flowers $\frac{1}{8}$ in. long. Calyx-limb small . . . . . 6. *G. micrantha.*
  More or less hairy.
    Stipules bidentate. Leaves chartaceous.
      Calyx-limb small. Disk flat . . . . . 7. *G. sphærocarpa.*
      Calyx-limb as long as the ovary. Disk fleshy, lobulate-sulcate . . . . . 8. *G. articulata.*
    Stipules tricuspidate. Leaves thinly coriaceous . 9. *G. sulphurea.*

1. **G. psychotrioides,** *DC. Prodr.* iv. 495. A small glabrous shining shrub. Branches subterete, smooth; at the extremities compressed and sulcate. Leaves oval, obtuse or shortly pointed at the apex, wedge-shaped or shortly narrowed at the base, thinly coriaceous, 4–8 by $1\frac{1}{2}$–$4\frac{1}{2}$ in., margins narrowly recurved, lateral veins about 10–12 pairs, not conspicuous, slender; petiole $\frac{1}{4}$–1 in.; stipules oval, subobtuse, undivided, about $\frac{3}{4}$ in. long, caducous. Flowers white, $\frac{1}{4}$–$\frac{1}{3}$ in. long when expanded, sessile, numerous, contiguous, in sessile terminal solitary heads. Bracteoles small, filiform. Calyx-limb cup-shaped, longer than the ovary, shortly and obtusely toothed, glabrous. Corolla-tube shortly cylindrical; throat bearded; lobes 5, ovate, rather shorter than the tube, reflexed. Anthers 5, partly exserted; filaments rather short. Style bidentate. Berry oblong, $\frac{1}{4}$ in. long, 10-ribbed, crowned by the calyx-limb.

Upper Guinea. Senegambia, at Itou, *Perrottet and Leprieur;* Sierra Leone, on mountains, *Barter!* on the Niger River at Abòh, *Th. Vogel!* Bagroo River, *Mann!* Niger Expedition, at Onitsha, *Barter!*

2. **G. succulenta,** *Schweinf. mss. in herb. sub* Psychotriâ. A glabrous succulent shrub, of considerable size. Branches somewhat compressed towards the extremities. Leaves oval, shortly pointed, rounded or obtuse occasionally wedge-shaped at the base, $5\frac{1}{2}$–$7\frac{1}{2}$ by $2\frac{1}{3}$–$3\frac{1}{3}$ in., or the uppermost pair at the base of the inflorescence half as long and broad, margins revolute, lateral veins about 14–17 pairs, patent; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules ovate, obtuse, clasping, undivided, connate at the base, $\frac{2}{5}$ in. long. Flowers about $\frac{1}{4}$ in. long, subsessile, numerous, arranged in ample rather dense terminal trichotomous corymbs of 6 in. diam.; bracts small; bracteoles minute. Calyx turbinate; limb longer than the ovary, shortly 5-cleft. Corolla white, scentless; tube short, straight; throat densely bearded; lobes 5, ovate, scarcely equalling the tube, recurving. Anthers linear-oblong, about double the length of the filaments. Style exserted, bidentate. Ovules with a few wrinkles.

Wiie Land. Niamniam-land, by the Rei stream in Ngnanje's country, *Schweinfurth!*

3. **G. Kirkii,** *Hiern.* A nearly glabrate shining bush. Branches subterete, somewhat compressed towards the extremities. Leaves narrowly elliptical, obtusely narrowed at the apex, wedge-shaped at the

base, glabrous, firmly chartaceous, 3–5 by $\frac{5}{6}$–$1\frac{2}{3}$ in., lateral veins about 14–16 pairs, spreading, slender, margins revolute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules broad, ovate-oblong, undivided, $\frac{1}{5}$–$\frac{2}{5}$ in. long, caducous. Flowers arranged in little heads, subsessile, forming divaricately branched, terminal, pedunculate bracteate panicles which are often overtopped by the lateral branches; common peduncle compressed, $\frac{3}{8}$–2 in. long, puberulous or glabrate. Calyx-limb short, 5-toothed. Corolla unknown. Berry $\frac{1}{5}$ in. long, 10-ribbed. Albumen of the seeds ruminated.

Mozamb. Distr. Mount Zomba, in the thick jungle under the rocky northern ridge, *Kirk!*

4. **G. macrocarpa,** *Hiern.* A glabrous shining tree, 30 feet high. Branches subterete, somewhat compressed towards the extremities. Leaves broadly oval, shortly pointed, nearly rounded or somewhat wedge-shaped at the base, 4–8 by 2–$4\frac{1}{4}$ in., margins revolute, lateral veins about 10–12 pairs, spreading, often with glandular pits at the junction with the midrib; petiole $\frac{5}{8}$–$1\frac{1}{4}$ in.; stipules oval, obtuse, undivided, $\frac{3}{4}$ in. long, caducous. Flowers $\frac{1}{2}$ in. long (or rather more) before expansion, on pedicels ranging up to about the same length, numerous, in rather lax divaricately branched pedunculate terminal cymes of 3–6 in. diam.; bracteoles small; common peduncle 1–$2\frac{1}{2}$ in. Calyx-limb hemispherical, truncate, subentire, $\frac{1}{8}$ in. diam. or rather more. Corolla-tube straight, erect; throat bearded; lobes 5, as long as the tube, oval-oblong, obtuse. Anthers 5, linear, three times the length of the filaments. Ovary small, somewhat compressed. Style glabrous, $\frac{3}{8}$ in. long, bidentate. Fruit turbinate, $\frac{5}{8}$–$\frac{2}{3}$ in. long, crowned by the persistent calyx-limb, indistinctly ribbed, 2-celled. Albumen ruminated.

Upper Guinea. Island of St. Thomas, at elevation of 4,000 feet above the sea, *Mann!*

5. **G. venosa,** *Hiern.* A glabrous shining leafy shrub, 8–15 feet high. Branches terete. Leaves oval, narrowly acuminate, usually wedge-shaped at the base, thinly coriaceous, turning reddish brown in the dry state especially beneath, 3–8 by $1\frac{1}{2}$–3 in., margins revolute, lateral veins about 9–12 pairs, conspicuous beneath; petiole $\frac{1}{3}$–1 in.; stipules ovate, bidentate, $\frac{1}{3}$–$\frac{3}{8}$ in. long, connate at the base, fragile. Flowers $\frac{1}{5}$ in. long, pentamerous, on shorter pedicels, very numerous, in rather dense much branched corymbose paniculate terminal pedunculate cymes of 3–6 in. diam.; common peduncle $\frac{1}{3}$–3 in. long, robust; bracts and bracteoles minute or obsolete or occasionally one pair of foliaceous bracts present. Calyx green or greenish white; limb hemispherical, equalling the disk and as long as the ovary, ciliolate, subtruncate or somewhat toothed. Corolla white; tube straight. Anthers partly exserted. Style included, shortly bilobed. Berries shortly globose, $\frac{1}{6}$ in. long.

Upper Guinea. Fernando Po, *Mann!*

6. **G. micrantha,** *Hiern.* A glabrous shining shrub, about 10 feet high. Branches terete smooth, towards the extremities compressed.

Leaves ovate, subacuminate, shortly wedge-shaped at the base, thinly coriaceous, of a deep green colour, 3–7 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 9–10 pairs; petiole $\frac{1}{3}$–1 in.; stipules ovate, $\frac{1}{8}$–$\frac{1}{4}$ in. long, bifid, caducous. Flowers about $\frac{1}{8}$ in. long, on short pedicels, in weak branched terminal and subterminal pedunculate cymes; common peduncle 1–$1\frac{1}{2}$ in.; bracts and bracteoles small. Calyx-limb small, subtruncate. Corolla white; throat bearded. Anthers exserted. Berries subglobose, about $\frac{1}{6}$ in. diam., obscurely ribbed.

Upper Guinea. Sierra Leone, *Afzelius!* Crado Lake near Valava Island, *Barter!* Lagos, *Barter!*

7. **G. sphærocarpa,** *Hiern.* A shrub, 8–10 feet high. Branches terete, smooth, compressed towards the extremities, glabrescent. Leaves oval, shortly and narrowly acuminate, wedge-shaped at the base, glabrate, deep green on both sides, firmly chartaceous, 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., margins narrowly revolute, lateral veins about 12–15 pairs, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., puberulous or glabrate; stipules oval-ovate, pubescent inside and along the middle of the back outside, ciliate, bidentate at the apex, $\frac{1}{2}$ in. long. Flowers pentamerous, many together, about $\frac{1}{6}$ in. long, on short pedicels, in subcorymbose divaricately branched pedunculate cymes of $1\frac{1}{2}$–2 in. diam.; common peduncles $\frac{3}{4}$–2 in. long; bracts cuspidate from a short broad base, at the top of the peduncle; bracteoles smaller. Calyx green; limb small, subtruncate. Corolla white; throat bearded. Anthers exserted. Berries subglobose, $\frac{1}{4}$ in. diam., indistinctly ribbed. Testa wrinkled.

Upper Guinea. Fernando Po, *Mann!*

8. **G. articulata,** *Hiern.* A somewhat hairy shrub; hairs reddish. Branches somewhat compressed towards the extremities. Leaves oval, very shortly acuminate, wedge-shaped at the base, chartaceous, glabrate above, hairy along the midrib beneath, of the same colour on both surfaces, 4–7 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., margins scarcely revolute, lateral veins close, about 15–16 pairs, conspicuous beneath; petiole $\frac{5}{8}$–$1\frac{1}{2}$ in.; stipules oval-ovate, $\frac{1}{2}$ in. long, bidentate, hairy outside near the base. Flowers $\frac{1}{4}$ in. long, pentamerous, mostly sessile or subsessile, articulated at the base, a few together, in many-flowered divaricately branched terminal pedunculate panicles of 4–6 in. diameter; common peduncle about $3\frac{1}{2}$ in. long; bracts small, apiculate from a broad base. Calyx-limb as long as or longer than the ovary, subtruncate, ciliolate. Corolla white, shortly lobed; throat densely bearded. Anthers included. Style bidentate or nearly entire. Ovules coarsely wrinkled. Disk lobulate-sulcate.

Upper Guinea. Eppah, *Barter!*

9. **G. sulphurea,** *Schweinf. mss. in herb. sub Psychotriâ.* A puberulous undershrub, 5 feet high. Branchlets compressed, subherbaceous. Leaves broadly ovate or oval, obtusely narrowed at the apex, wedge-shaped at the base, puberulous on both sides, thinly coriaceous, 5–6 by 2–$3\frac{1}{4}$ in. or some smaller, lateral veins about 12–16 pairs, margins nearly flat; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules broadly ovate,

$\frac{1}{3}$–$\frac{3}{8}$ in. long, tricuspidate at the tip. Flowers sulphur-coloured, about $\frac{1}{8}$ in. long, subsessile, many together, crowded in terminal simple or branched capitate cymes; bracteoles minute or absent; common peduncle about 1 in., erect, robust. Calyx puberulous; limb short, obscurely toothed. Corolla-lobes 5; tube straight. Style bidentate. Berry didymous, depresso-globose, vaguely ribbed, $\frac{1}{4}$ in. diameter, 2-celled, 2-seeded. Albumen apparently ruminated.

Nile Land. Niamniam-land, near Bendo, *Schweinfurth!* near Maschirr Hills, *Schweinfurth!*

63. **TRIAINOLEPIS,** Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 126.

Calyx-tube campanulate; limb cup-shaped, unequally 5–7-toothed; teeth subulate, persistent. Corolla woolly-tomentose; tube slender, exceeding the calyx, glabrous inside, throat densely bearded; lobes 5, lanceolate, spreading, woolly outside, glabrous inside, valvate in æstivation. Stamens 5, inserted at the throat of the corolla, glabrous; anthers oblong, dorsifixed, partly exserted; filaments short. Disk hemispherical, hairy. Ovary 5–7-celled; style glabrous, exserted, filiform, with 5–7 lobes at the apex; ovules solitary erect, compressed, anatropous; placentas inconspicuous. Fruit pisiform, 5–7-celled; pyrenes bony, 1-seeded. Seeds compressed, erect; testa membranous; albumen fleshy; cotyledons small; radicle terete, inferior.—Branches woody terete; leaves opposite; stipules small tricuspidate; flowers rather small hermaphrodite in terminal corymbose cymes.

A genus comprising the two following species and confined to this Flora and to Madagascar, unless indeed, as seems probable, it ought to be united with *Psathura*, Poir.

Style with linear lobes, not capitate. Leaves pubescent beneath . . . . . 1. *T. africana.*
Style capitate-lobulate at the apex. Leaves nearly glabrous . . . . . 2. *T. Hildebrandtii.*

1. **T. africana,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* ii. 126. Much branched, young parts pubescent; branches reddish. Leaves ovate or nearly elliptical, acuminate or acute, wedge-shaped at the base, chartaceous, puberulous above, appressedly pubescent beneath, $2\frac{1}{2}$–4 by 1–$1\frac{3}{4}$ in., lateral veins about 10–12 pairs, slender; petiole $\frac{1}{5}$–$\frac{3}{5}$ in. long; stipules about $\frac{1}{8}$ in. long, teeth filiform glabrous. Flowers $\frac{2}{3}$ in. long; limb $\frac{3}{8}$–$\frac{1}{2}$ in. diameter.

Mozamb. Distr. Rovuma Bay, 10° S. Lat., *Kirk!*

2. **T. Hildebrandtii,** *Vatke in Oesterr. Bot. Zeitschr.* xxv. p. 230 (1875). A nearly glabrescent shrub, 6–7 feet high. Leaves narrowly ovate or elliptical, narrowed at both ends, firmly chartaceous, nearly glabrous above, rather hairy in the axils of the 9–10 pairs of lateral veins, 2–4 by $\frac{1}{2}$–1 in.; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers $\frac{1}{2}$ in. long, white. Ovary 7–6-celled; style capitate-lobulate. Fruit red.

Mozamb. Distr. Zanzibar Island, in sandy places, *Hildebrandt!*
Occurs also in North West Madagascar (*Perrillé!*).

64. **GEOPHILA,** D. Don; Benth. et Hook. f. Gen. Pl. ii. p. 127.

Calyx-tube small, campanulate; limb 4–6-toothed or -partite, often irregular, persistent. Corolla membranous, funnel-shaped, longer than the calyx; throat densely bearded; limb usually 5-partite, spreading, lobes ovate, valvate in æstivation. Stamens usually 5, inserted at the throat of the corolla, exserted or included; anthers linear, dorsifixed above the base; filaments slender. Disk elevated, glabrous. Ovary 2-celled; style slender, with 2 branches, included or exserted; ovules solitary, erect; placentas inconspicuous. Fruit fleshy, pisiform, costate or smooth; pyrenes 2, crustaceous, 1-seeded. Seeds with horny albumen; embryo minute, radicle inferior.—Small slender creeping rooting perennial herbs with opposite cordate petiolate leaves, interpetiolar entire or cleft stipules, and small terminal or lateral flowers bracteate at the base or enclosed a few together in cup-shaped or hemispherical involucres.

A genus of a few species scattered over the tropics; absent from Australia.

Flowers bracteate at the base but not enclosed in cup-shaped involucres.	
Peduncles bearing more than 1 flower.	
Glabrous or somewhat pubescent. Peduncles 2–3-flowered, $\frac{2}{3}$–$1\frac{1}{4}$ in. long. Leaves reniform or nearly orbicular	1. *G. reniformis.*
Hirsute. Peduncles bearing several flowers, very abbreviated. Leaves ovate or oval	2. *G. hirsuta.*
Peduncles 1-flowered.	
Peduncles lateral from the prostrate stems. Stipules lanceolate, bipartite	3. *G. lancistipula.*
Peduncles terminating short erect leaf-bearing branches. Stipules ovate or rounded, entire	4. *G. uniflora.*
Flowers enclosed in cup-shaped or hemispherical involucres.	
Calyx-lobes subulate.	
Stipules bifid. Involucres shortly pubescent. Flowers bracteolate	5. *G. Afzelii.*
Stipules entire. Involucres glabrous. Flowers ebracteolate	6. *G. obvallata.*
Calyx-segments obovate	7. *G. involucrata.*

1. **G. reniformis** (?), *D. Don, Prodr. Fl. Nepal.* p. 136. Stems glabrous or puberulous. Leaves reniform or nearly orbicular, rounded or nearly so or retuse at the apex, deeply cordate at the base, glabrous or nearly so, more or less chartaceous, 1–2 in. long, rather paler beneath; petiole ranging from 1 to 4 in. long, shortly hairy; stipules ovate, all or mostly bipartite or geminate?, about $\frac{1}{12}$ in. long, glabrous. Flowers 2 or few together, lateral ones sessile or subsessile; common peduncle solitary, glabrous or nearly so, terminating short erect leaf-bearing branches, $\frac{2}{3}$–$1\frac{1}{4}$ in. long; bracts subulate-setaceous from a broad base, $\frac{1}{5}$–$\frac{1}{4}$ in. long. Calyx $\frac{1}{4}$ in. long; segments 5, subulate-setaceous. —Benth. in Hook. Niger Fl. p. 422.

Upper Guinea. On the Nun River, *Th. Vogel!* Island of St. Thomas, *G. Don!* ? Niger Expedition, at Brass (leafy stem without flowers), *Barter!*

Differs from the American and from most Indian specimens, that have been referred to this species, by the divided stipules; it may constitute a separate species.

2. **G. hirsuta,** *Benth. in Hook. Niger Fl.* p. 422. Stems creeping, hirsute, rooting at the nodes. Leaves ovate or oval, rounded or obtusely pointed at the apex, reniform at the base, thinly chartaceous, glabrescent above, except the midrib, somewhat hairy on the nerves beneath, 1–1¾ in. long; petiole ½–1 in., hirsute; stipules lanceolate, bifid or bidentate, ⅛–⅕ in. long. Flowers 4–5-merous, ⅜ in. long, several together on very abbreviated peduncles which terminate the short erect hirsute branches and are overtopped by the uppermost leaves. Calyx half the length of the flower; segments pilose-ciliate, subulate. Corolla white; lobes ovate. Anthers exserted. Fruit of bright orange colour.

Upper Guinea. On the Nun River, *Th. Vogel!* Niger Expedition, at Brass, *Barter!*

3. **G. lancistipula,** *Hiern.* Step creeping, rooting at the nodes, glabrous. Leaves reniform, nearly rounded at the apex, deeply cordate at the base, thinly chartaceous, glabrous, rather paler beneath, 1½–2 in. long; petiole 1½–3 in. long, glabrous or somewhat hairy; stipules geminate or bipartite, lanceolate, ⅛ in. long. Flowers solitary, bracteate at the base, ½ in. long; bracts subulate; peduncle ⅓–¾ in. long, bracteate about the middle, lateral from the prostrate stems. Calyx ⅙ in. long, somewhat hairy; lobes subulate, persistent. Corolla white; lobes ovate-lanceolate. Anthers included. Fruit ovoid, ⅖ in. long.

Upper Guinea. Sierra del Crystal, 1° N. Lat., *Mann!*

4. **G. uniflora,** *Hiern.* Stem creeping with short erect branches, rooting at the nodes, glabrous or nearly so. Leaves reniform or nearly orbicular, rounded at the apex or nearly so, deeply cordate at the base, glabrous or very nearly so, submembranous, rather paler beneath, 1–1¾ in. long; petiole ¾–1¾ in. long, puberulous; stipules shortly ovate or rounded, undivided, obtuse, 1/16–1/12 in. long. Flowers solitary, ¼–⅓ in. long, glabrous, bracteate at the base; bracts lanceolate-subulate, shorter than the calyx; peduncles (usually) solitary, terminating short erect leaf-bearing branches, ⅛–½ in. long. Calyx half the length of the flower; lobes lanceolate-subulate. Corolla white; lobes ovate. Anthers included. Fruit ovoid, ⅙ in. long exclusive of the persistent calyx-limb.

Upper Guinea. In shady woods, Niger Expedition, at Nupe, *Barter!*
Nile Land. Niamniam-land, *Schweinfurth!*

5. **G. Afzelii,** *Hiern.* Stems creeping, puberulous, rooting at the nodes. Leaves erect, ovate or cordiform, obtuse or nearly rounded at the apex, cordate or reniform at the base, thinly chartaceous, rather paler beneath, very nearly or quite glabrous, 1¼–2 by 1–1¾ in.; petiole ¾–3 in., more or less pubescent; stipules broadly oval, bifid, ⅛–⅙ in. long, glabrous or nearly so. Flowers ⅓ in. long, pentamerous, about 6 together, on short pedicels, bracteate, surrounded by a cup-shaped involucre as long as the flowers; bracts of the involucre oval, rounded, shortly pubescent outside, imbricated; common peduncle solitary, terminating short leaf-bearing erect branches, ¼–1½ in. long, shortly

pubescent, inner bracts narrower, ciliate. Calyx-limb with short ovate or subulate unequal teeth. Corolla-buds hairy; lobes deltoid. Fruit violaceous.

Upper Guinea. Sierra Leone, *Afzelius!* Prince's Island, *Mann!*

6. **G. obvallata,** *F. Didr. in Copenhag. Vidensk. Medd.* 1854, p. 186. Stems creeping, 20–30 feet long, 1–2 in. high, rooting at the nodes, glabrous. Leaves ovate or cordiform, obtuse or nearly rounded at the apex, reniform at the base, thinly chartaceous, glabrous or nearly so, rather paler beneath, $\frac{3}{4}$–2 by $\frac{1}{2}$–$1\frac{3}{4}$ in.; petiole $\frac{3}{4}$–3 in., glabrous or with a row of short hairs; stipules rounded, glabrous, entire, $\frac{1}{12}$–$\frac{1}{10}$ in. long. Flowers about $\frac{1}{3}$ in. long, pentamerous, on very short pedicels, about 2–6 together, enclosed in a cup-shaped or hemispherical involucre nearly as long as the flowers; bracts of the involucre about 4, roundly oval, imbricated, glabrous; bracteoles absent; common peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in. long, glabrous, terminating short leaf-bearing erect branches. Calyx green; limb with unequal subulate teeth falling short of the white glabrous corolla-limb. Fruit red, $\frac{1}{4}$ in. diameter.—*Psychotria obvallata,* Schum. Beskr. Guin. Pl. p. 111; *Geophila* (probably a species of), Benth. in Hook. Niger Fl. p. 421; *Geophila,* spec. aff. *G. reniformi,* Benth. l.c. p. 422.

Upper Guinea. Sierra Leone, *Afzelius!* Senegambia, (*Heudelot*)*!* Aquapim, *Isert;* Niger Expedition, at Brass, creeping about the roots of trees, *Barter!* Fernando Po, *Barter! Mann!*

7. **G. involucrata,** *Schweinf. mss. in herb.* Puberulous. Leaves nearly orbicular, rounded at the apex, reniform at the base, very nearly glabrous, membranous, rather paler beneath, $1\frac{1}{2}$–3 in. diameter; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in.; stipules semicircular, glabrous, entire, $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers about $\frac{1}{3}$ in. long or more, about 9 together, crowded, bracteate, enclosed within an imbricated glabrous hemispherical involucre of $\frac{1}{2}$–1 in. diameter, glabrous; bracts broadly oval, entire or cleft; common peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long, terminal on short branches overtopped by the leaves. Calyx $\frac{1}{3}$ in. long; segments obovate, obtuse, 4–6, about $\frac{1}{5}$ in. long. Corolla white; lobes 5, ovate, obtuse. Style-branches short, broad.

North Central. Monbuttu-land, near Munsa, *Schweinfurth!*
Nile Land. Niamniam-land, at Mbruole, *Schweinfurth!*

65. CEPHAËLIS, Swartz; Benth. et Hook. f. Gen. Pl. ii. p. 127.

Calyx-tube campanulate or oblong; limb toothed or cleft or slit down one side, persistent. Corolla funnel-shaped or salver-shaped; tube short or elongated; lobes usually 5, short, erect or spreading, valvate in the bud; throat more or less bearded. Stamens usually 5, inserted on the throat of the corolla; anthers linear or oblong; exserted or included, fixed at the back. Disk various, glabrous. Ovary 2- or rarely 3–4-celled; style filiform, glabrous, exserted or included, branches as many as the cells of the ovary; ovules solitary, erect, oblong, more or less compressed and wedge-shaped, anatropous. Fruit

nearly dry or fleshy; pyrenes smooth or ribbed. Seeds solitary; radicle inferior.—Small shrubs with opposite leaves, ample usually bidentate stipules and rather small flowers crowded in terminal and axillary pedunculate or rarely sessile involucrate heads.

A considerable tropical genus, chiefly American. According to the usual principles of nomenclature, one of the names of Aublet, quoted by Bentham and Hooker, ought to be employed for this genus in preference to Swartz's; a still older name however, is *Ouragoga*, Linn. Gen. Pl., edit. i., p. 378 (1737).

Flower heads pedunculate.
- Ovary 2-celled.
  - Calyx regularly toothed or lobed.
    - Corolla much exceeding the calyx opening.
      - Leaves glabrous or nearly so . . . . . 1. *C. peduncularis.*
      - Leaves scattered with hairs along the midrib and veins beneath.
        - Heads solitary. Corolla-lobes not cornuate . . 2. *C. suaveolens.*
        - Heads corymbose. Corolla-lobes cornuate at the back . . . . . 3. *C. cornuta.*
    - Corolla about equalling the calyx, opening.
      - Leaves glabrate, obtuse at the base . . . . . 4. *C. fuscescens.*
      - Leaves scabrid-hirsute, wedge-shaped at the base. 5. *C. rubescens.*
    - Corolla shorter than the calyx, calyptriform . . . 6. *C. clausa.*
  - Calyx slit down one side . . . . . 7. *C. spathacea.*
- Ovary 3–4-celled.
  - Calyx-limb cylindrical, 5–6-cleft, ciliate . . . . . 8. *C. Mannii.*
  - Calyx-limb hemispherical, dentate, puberulous . . . 9. *C. latifolia.*

Flower-heads sessile . . . . . 10. *C. congensis.*

1. **C. peduncularis,** *Salisb. Parad. Lond.* t. 99 (1808). A branching shrub of 2–8 feet, sometimes creeping, or a small tree. Branches somewhat thickened at the nodes and compressed towards the extremities. Leaves oval or somewhat obovate, shortly or scarcely acuminate, obtuse or narrowed at the base, spreading, coriaceous, glabrous or nearly so, 3–9 by $1\frac{3}{8}$–$3\frac{1}{2}$ in., lateral veins about 13–17 pairs; petiole $\frac{1}{6}$–1 in. long; stipules broadly oval or ovate, bifid, $\frac{1}{4}$–$\frac{7}{8}$ in. long, puberulous at the back near the base, whitish-green, deciduous, leaving a ring of hairs on the branch at the base. Flowers pentamerous, $\frac{1}{3}$–$\frac{1}{2}$ in. long, subsessile or shortly pedicellate, crowded many together, in globose pedunculate terminal or subterminal heads of about 1 in. diameter; common peduncle puberulous or glabrate, $\frac{1}{2}$–4–$5\frac{1}{2}$ in. long; outer bracts involucrate, connate at the base, about $\frac{1}{2}$ in. long; inner small. Calyx green; limb shortly lobed or toothed, ciliate or glabrous, much shorter than the corolla. Corolla white; tube slender below; limb shorter. Fruit yellow, ellipsoidal, ribbed, $\frac{1}{4}$ in. long; albumen a little ruminated.—*C. pedunculata*, G. Don, Gen. Syst. iii. p. 605; *C. coriacea*, G. Don, *l.c.* p. 606; *C. bidentata*, Benth. in Hook. Niger Fl. p. 421, *ex parte*, non Thunb; *Morinda palmetorum*, DC. Prodr. iv. p. 448; Perr. & Leprieur ex A. Rich. in Mém. Soc. Hist. Nat. Par. v. p. 211 (1834).

Upper Guinea. Senegambia, *Leprieur and Perrottet, Döllinger! Heudelot!* Cape Palmas, *Th. Vogel!* Sierra Leone, *Smeathman! Afzelius! G. Don!* Fernando Po, *Barter! Mann!* Prince's Island, *Barter!* Bagroo River, *Mann!*

Lower Guinea. Loango, *Soyaux!*

Perhaps two species are here confused, but their separation is difficult; in the type of *C. peduncularis* the calyx-lobes are not very small and are ciliate, and in *C. coriacea* the calyx-teeth are very small and quite glabrous, but intermediate forms appear to exist.

2. **C. suaveolens,** *Schweinf. mss. in herb.* An undershrub, 3–5 feet high; young parts shortly tomentose and puberulous. Leaves oval, shortly acuminate, wedge-shaped at the base, chartaceous, 6–9 by 3–4½ in., lateral veins about 18–20 pairs, marked with a few scattered hairs beneath; petiole ½–⅘ in.; stipules broadly oval, connate at the base, bifid, puberulous outside, ¾ in. long. Flowers pentamerous, white, sweet-scented, shortly pedicellate, about ¼ in. long, numerous, densely packed in hemispherical dilated axillary subterminal pedunculate solitary heads of about 1 in. diameter; common peduncle subtomentose, about 1½ in. long; involucral bracts 4. Calyx-limb small, 5-toothed. Corolla-tube 4 times the length of the calyx-limb, "10-striate" (Schweinf. mss.). Ovary striate, 2-celled. Berry oval-globose, "12-sulcate" (Schweinf. mss.).

Nile Land. Djur-land, *Schweinfurth!*

3. **C. cornuta,** *Hiern.* Upper leaves obovate, cuspidate, wedge-shaped at the base, membranous, glabrous above, puberulous beneath along the midrib, 4½ by 2½ in., margins flat, lateral veins about 13 or 14 pairs, rather slender; petiole ¼ in. long; stipules broad, ⅓ in. long, shortly cleft, glabrous except the ciliolate margin. Flowers about ¼–⅜ in. long, glabrous outside, subsessile, many together in heads of ½–1 in. diameter which are arranged a few together in shortly rufous-pubescent terminal pedunculate corymbs exceeding the upper leaves; peduncles of the general inflorescence 1¼–2½ in. long; involucral bracts of the heads ovate and lanceolate, acuminate, falling short of the flowers; bracts of the general inflorescence, ¼–⅓ in. long, incise-cleft, lobes acutely acuminate. Tube of the calyx-limb membranous, exceeding the ovary; lobes ovate, acute, short. Corolla much exceeding the calyx, salver-shaped; throat densely bearded; lobes horned at the back near the apex. Anthers exserted. Style exserted, puberulous and bifid above; divisions spreading.

Upper Guinea. Old Calabar, *Dr. Robb!*

4. **C. fuscescens,** *Hiern.* A nearly glabrous shrub, about 5 feet high. Leaves oval or somewhat obovate, shortly acuminate, wedge-shaped at the base, thinly chartaceous, of nearly the same fuscous hue on both surfaces, 8–9 by 4–4¼ in., lateral veins about 22 pairs; petiole ½–¾ in. long; stipules ample, connate at the base bi-?cuspidate, ½ in. long. Flowers pentamerous, about ⅜ in. long, sessile, numerous, crowded together in dense hemispherical terminal shortly pedunculate heads of about 1 in. diameter; common peduncle about ½ in. long; involucral bracts ample, imbricated, inner bracts narrow ciliate. Calyx-limb deeply lobed; lobes narrowly linear, ciliate. Corolla rather exceeding the calyx. Ovary glabrous, 2-celled. Style exserted.

Upper Guinea. Sierra del Crystal, *Mann!*

5. **C. rubescens,** *Hiern.* A nearly glabrous shrub, about 6 feet high, of a pale reddish colour towards the extremities and on the lower surface of the leaves. Leaves obovate-oval, obtusely pointed or scarcely acuminate, narrowing towards the obtuse base, chartaceous, 10–12 by $3\frac{1}{2}$–$5\frac{1}{4}$ in., lateral veins about 24 pairs, rather slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules suborbicular or somewhat obovate, connate at the base, bifid, fimbriate-ciliate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, lobes apparently bicuspidate. Flowers pentamerous, $\frac{1}{2}$ in. long, numerous, sessile, densely crowded in terminal shortly pedunculate hemispherical heads of about $1\frac{1}{2}$ in. diameter; common peduncle $\frac{2}{3}$–$1\frac{1}{2}$ in. long; involucral bracts ample, imbricated, as long as the head; inner bracteoles narrow, ciliate. Calyx-limb deeply lobed, lobes narrow, ciliate. Corolla rather shorter than the calyx. Ovary glabrous, 2-celled.

Upper Guinea. Sierra del Crystal, *Mann!*

6. **C. clausa,** *Hiern.* A small undershrub, herbaceous and hirsute-hispid towards the extremities. Leaves oval-oblong, subacuminate, wedge-shaped at the base, chartaceous, scabrous-hairy on both sides, spreading, 8–10 by $2\frac{1}{2}$–$3\frac{2}{3}$ in., lateral veins about 12–17 pairs, slender, petiole $\frac{1}{3}$–$\frac{2}{3}$ in., hirsute-hispid; stipules ample, connate, bicuspidate, $\frac{3}{4}$ in. long, hispid. Flowers pentamerous, about $\frac{1}{4}$ in. long, numerous, crowded, sessile, in hemispherical dense axillary and terminal shortly pedunculate heads of 1–$1\frac{1}{2}$ in. diameter; common peduncle $\frac{1}{3}$–$\frac{1}{2}$ in. long; involucral bracts ample, imbricated, equalling the heads; inner bracts narrower, pilose-hispid and -ciliate. Calyx-limb cleft half way, persistent; lobes lanceolate, pilose-hispid. Ovary densely hispid, 2-celled. Corolla closed, apparently not opening, calyptriform, not exceeding the calyx. Fruit narrowly ovoid, $\frac{2}{3}$ in. long.

Upper Guinea. Gaboon River, *Mann!*

7. **C. spathacea,** *Hiern.* A shrub, about 10–12 feet high, nearly glabrous. Leaves oval, shortly acuminate, obtuse or somewhat wedge-shaped at the base, firmly chartaceous, 9–16 by 4–6 in., lateral veins about 22 pairs, clearly marked as also the connecting tertiary veins beneath; stipules ovate, bifid, $\frac{1}{2}$ in. or more. Flowers pentamerous, $\frac{1}{2}$–$\frac{2}{3}$ in. long, numerous, subsessile, crowded in terminal or subterminal shortly pedunculate hemispherical heads of 1–$1\frac{1}{2}$ in. diameter; common peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long; involucre very coriaceous, entire except the apex, nearly equalling the flower. Calyx-limb tubular-spathaceous, oblique at the apex, open, cut half way down one side, shortly ciliate at the top. Corolla about twice the length of the calyx. Ovary glabrous, 2-celled. Fruit dicoccous; cocci ribbed.

Upper Guinea. Island of St. Thomas, 2000 feet alt., *Mann!*

8. **C. Mannii,** *Benth. et Hook. f. Gen. Pl.* ii. 128. A leafy shrub, 15 feet high. Branches robust, green. Leaves oval-obovate, subacuminate, wedge-shaped at the base, glabrous, thinly coriaceous, shining, 8–12 by 3–6 in., lateral veins about 10–12 pairs, midrib red below; petiole $1\frac{1}{2}$–3 in.; stipules broadly oval, $\frac{3}{4}$ in. long, bidentate, connate at the base. Flowers $\frac{2}{3}$–1 in. long, densely crowded, subsessile, in pedun-

culate subterminal heads of 1½–5 in. diameter; common peduncle 8–12 in. long, scarlet, compressed, curving outwards and downwards beyond the foliage and becoming thickened as it bends upwards at the tip; involucre scarlet. Calyx-limb cylindrical, 5–6-cleft; lobes ciliate. Corolla white or yellow, exceeding the calyx; tube coriaceous, ½–¾ in. long; lobes spreading. Anthers exserted. Ovary 3–4-celled.—*Camptopus Mannii*, Hook. f. in Bot. Mag. t. 5755.

Upper Guinea. Fernando Po, *Mann!*; Old Calabar.

9. **C. latifolia,** *Hiern.* A glabrous shrub. Leaves broadly oval, subacuminate, shortly narrowed at the base, coriaceous, 6–10 by 4–7 in., lateral veins about 12 pairs; petiole 3–4½ in.; stipules oval, bidentate, 1 in. long. Flowers ½ in. long or more, on short puberulous pedicels, numerous, in rather branched involucrate pedunculate subterminal heads of 2–3 in. diameter; common peduncles about 5 in. long. Calyx-limb hemispherical, puberulous, small, dentate. Corolla tubular, shortly 5-lobed, much exceeding the calyx. Fruit ¼ in. long, 3-celled, ribbed.

Upper Guinea. Gaboon River, *Mann!*

10. **C. congensis,** *Hiern.* Shrubby, glabrous. Branches terete, towards the extremities somewhat compressed. Leaves obovate-oval, obtuse, rounded or shortly pointed at the apex, wedge-shaped at the base, thinly coriaceous, of nearly the same colour on both surfaces, 4–5½ by 1½–2½ in., margins nearly flat, lateral veins about 9–10 pairs, inconspicuous; stipules connate and sheathing, about ⅓ in. long, free portion ovate, short. Flowers pentamerous, about ¼ in. long, sessile, many together, in sessile terminal heads. Bracts about ⅔ in. long, ovate, acute or cuspidate, connate, involucrate; bracteoles wanting or inconspicuous. Calyx-limb longer than the ovary, with about 5 vague short rounded teeth. Corolla rather exceeding the calyx, cleft; throat bearded. Ovary apparently 2-celled; style bifid, glabrous. Fruit subglobose, longitudinally furrowed, ¼ in. diameter.

Lower Guinea. Congo, *Chr. Smith!*

66. TRICHOSTACHYS, Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 128.

Calyx-tube campanulate or obovoid; limb larger, campanulate or oblong, 4–6-lobed, persistent; lobes spreading, hispid or ciliate. Corolla not much exceeding the calyx, funnel-shaped or subcampanulate; throat hairy; lobes 4–6, ovate or lanceolate, spreading, valvate in the bud. Stamens 4–6, inserted in the throat of the corolla; filaments short; anthers included, linear, glabrous or hairy, fixed at the back above the base. Disk cushion-shaped or elevated. Ovary 2-celled; style slender, glabrous, with 2 short obtuse branches; ovules solitary, erect. Fruit small, ovoid or subglobose; pyrenes 2, plano-convex, crustaceous, small. Seeds smooth; testa membranous; albumen fleshy; radicle inferior.—Small subherbaceous plants with opposite

leaves, oval or lanceolate stipules and small white flowers densely packed in globose or oblong terminal exinvolucrate heads.

A genus limited to this Flora.

Calyx-lobes ovate, shorter than the tube of the limb.
- Leaves glabrous, 12–15 in. long . . . . . 1. *T. longifolia.*
- Leaves shortly pubescent on veins beneath, 4½–6 in. long . 2. *T. petiolata.*

Calyx-lobes lanceolate, equalling the tube of the limb . . . 3. *T. aurea.*

Calyx-lobes linear-lanceolate, long-ciliate, longer than the tube of the limb . . . . . 4. *T. ciliata.*

1. **T. longifolia,** *Hiern.* Stem or branches compressed above, nearly glabrous. Leaves oblanceolate, shortly and acutely acuminate, gradually narrowing to a subsessile base, glabrous, firmly chartaceous, 12–15 by 3½–4½ in., lateral veins about 14–16 pairs, clearly marked beneath; stipules oval, obtuse, undivided, 1–1¼ by ⅝–¾ in., ciliate. Flowers 5–6-merous, ⅕? in. long, numerous, crowded in dense subterminal pedunculate globose heads of ½ in. diameter; common peduncle 1–2 in. long, densely hirsute-hispid, erect. Calyx about ⅙ in. long; limb tubular, with obtuse ovate lobes. Corolla hairy inside on the lobes and shaggy at the throat; tube glabrous inside. Style glabrous.

Upper Guinea. Gaboon River, *Mann!*

2. **T. petiolata,** *Hiern.* Stem or branches hairy above. Leaves obovate-oval, mucronate, somewhat narrowed towards the rounded petiolate base, chartaceous, glabrous above, shortly pubescent beneath on the midrib and about 9 pairs of lateral veins, 4½–6 by 2–2½ in.; petiole ⅓–⅔ in. long, densely hairy; stipules ovate-oblong, obtuse, nearly ½ in. long. Flowers numerous, densely packed in oblong terminal and subterminal pedunculate heads of 1–1½ in. long. Calyx and corolla white. Calyx-limb 4–5-lobed; lobes short, ovate, shortly ciliate.

Upper Guinea. Cameroon River, *Mann!*

3. **T. aurea,** *Hiern.* 1–2 feet high. Stem or branches hairy above. Leaves obovate-oval, cuspidate-acuminate, wedge-shaped at the subsessile base, glabrous above except the hirsute midrib, firmly chartaceous, 3½–6 by 2–3¼ in., margins ciliate, hairs golden, lateral veins about 9–11 pairs; stipules lanceolate, ⅓ in. long, ciliate. Flowers pentamerous, small, numerous, crowded in dense ellipsoidal pedunculate terminal heads ½ in. long. Calyx-limb half cleft; lobes lanceolate, hairy.

Upper Guinea. Sierra del Crystal, *Mann!*

4. **T. ciliata,** *Hiern.* Stem short, terete below, hispid above. Leaves obovate, cuspidate-apiculate, strigose-hispid on both sides, gradually narrowed to a shortly petiolate base, 3½–5 by 1½–2½ in., lateral veins about 6 pairs, inconspicuous; stipules sheathing, ½ in. long. Flowers pentamerous, numerous, very shortly pedicellate, in dense hemispherical terminal heads of 1–1¼ in. diameter. Calyx ¼–⅓ in. long; teeth linear-lanceolate, long-ciliate. Corolla hispid on the lobes.

Upper Guinea. Sierra del Crystal, *Mann!*

67. **LASIANTHUS,** Jack; Benth. et Hook. f. Gen. Pl. ii. p. 129.

Calyx-tube subglobose ovoid or oblong; limb short or long, 3–6-toothed or -lobed, persistent. Corolla campanulate or funnel-shaped or salver-shaped; throat bearded; lobes 4–6, valvate in the bud. Stamens glabrous, exserted on the throat of the corolla; filaments short; anthers fixed at the back near the base, oblong or linear; connective apiculate. Disk short. Ovary 4–12-celled; style with 4–12 obtuse branches; ovules solitary, erect, anatropous, linear. Fruit 4–12-pyrenous; pyrenes keeled, 1-seeded. Embryo terete, elongated; radicle inferior.—Shrubs with distichous leaves, ovate or lanceolate stipules, and small flowers fascicled in the axils.

A large genus chiefly inhabiting Tropical Asia.

L. africanus, *Hiern.* A climbing shrub of 8 feet, nearly glabrous and shining. Branches divaricate. Leaves ovate-oval, acuminate, wedge-shaped at the base, firmly chartaceous, glabrous, $2\frac{1}{2}$–$4\frac{1}{2}$ by 1–$1\frac{3}{4}$ in., lateral veins about 5–6 pairs; petiole $\frac{1}{8}$–$\frac{1}{2}$ in.; stipules $\frac{1}{4}$ in. long. Flowers 4–5-merous, subsessile, a few together; pedicels very short, hairy. Calyx-limb cleft, rather small. Corolla not much exceeding the calyx. Ovary 12-celled. Fruit 12-pyrenous, $\frac{1}{4}$ in. diameter.

Upper Guinea. Island of St. Thomas, at elevation of 500 feet, *Mann!*

A specimen from the country of the Gaboon River also collected by Mann, has larger leaves hairy on the midrib beneath and a fruit with 11 pyrenes; it appears to be a distinct but closely allied species.

68. **SIPHOMERIS,** Boj. in Rapp. de la Soc. d'Hist. Nat. de l'Île Maurice (1826 and 1829), ex Boj. Hort. Maurit. p. 170. (Leontea, A. Rich.; Benth. et Hook. f. Gen. Pl. ii. p. 134.)

Calyx-tube campanulate or ovoid; limb 5-partite, segments subulate, elongated, recurving, persistent. Corolla salver-shaped, exceeding the calyx; tube elongated, slender, straight, at length splitting at the base; throat bearded or naked; limb spreading, 5-partite, segments oval ovate or oblong, valvate in the bud. Stamens 5, inserted at the mouth or throat of the corolla, more or less exserted, glabrous; filaments short. Disk low. Ovary 2–3-celled; style slender, branches 2–3, obtuse, spreading; ovules solitary, erect, compressed. Fruit dorsally compressed or 3-sided; epicarp membranous, bursting in a valvate manner from the base; valves 2–3, bifid at the base; pyrenes 2–3, compressed, suborbicular or oval, winged, retuse at both ends or at the base, each suspended at the apex from a filiform exterior column. Seed compressed; testa very thin, polished; albumen thin; embryo broad, thin, radicle short inferior, cotyledons foliaceous, venose, orbicular or ovate.—Climbing undershrubs with petiolate thin leaves, ovate or lanceolate stipules and subsessile flowers in axillary and terminal pedunculate clusters or solitary.

A small genus occuring also in Madagascar and the Comoro Islands.

S. fœtens, *Hiern.* A fetid yellowish green climber, shortly hairy. Leaves ovate, suddenly acuminate, obtuse or subreniform at the base, 1½–3 by 1–2 in.; margins (in the dry state) crenulate-undulate; petiole about half as long; stipules ovate-lanceolate, ⅕–⅓ in. long. Flowers ⅓–½ in. long; common peduncles ranging up to 3 in., spreading, the upper ones gradually shorter. Corolla-mouth hispid-bearded. Fruit suborbicular-ovate, ½ in. diameter. Fruit ½ in. long.

Mozamb. Distr. N'Kneza, North of Senna, and by the Shire about the cataracts, *Kirk!* Zambesi-land, *Stewart!*

69. ANTHOSPERMUM, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 140.

Calyx-tube obovoid; limb 4–5-toothed, minute except that 1–2 lobes are sometimes produced into leaf-like appendages. Corolla funnel-shaped, usually tetramerous; lobes revolute, valvate in the bud. Stamens inserted on the corolla-tube, glabrous; anthers fixed at the back of the base, linear-oblong; filaments slender. Disk obsolete. Ovary 2-celled; style with 2 diverging scabrous branches; ovules solitary, erect, anatropous. Fruit dry, obovoid, dicoccous. Seeds erect; radicle inferior.—Heath-like undershrubs with usually fasciculate rigid leaves, subulate or 4-cuspidate stipules, and dicœcious small solitary axillary flowers.

A genus of moderate size, prevalent at the Cape of Good Hope and occurring also in Madagascar.

Stipules subulate, entire . . . . . 1. *A. pachyrrhizum.*
Stipules 4-cuspidate.
  Leaves in interrupted fascicles, ⅓–¾ in. long. Plant 1–1½ feet high . . . . . 2. *A. muricatum.*
  Leaves in crowded fascicles, ⅙–⅓ in. long. Plant 6 inches high . . . . . 3. *A. asperuloides.*

1. **A. pachyrrhizum,** *Hiern.* Suffruticose, branched from a thick woody stock. Branches decumbent or ascending, pale-puberulous, 6–9 in. long, wiry. Leaves linear, apiculate, subsessile, rather rough above, ⅓–⅔ in. long, margins revolute, scabrid; stipules small, subulate, undivided, adnate at the base to the petiole or leaf-base. Flowers small.—*A. hirsutum,* A. Rich. Fl. Abyss. i. p. 346, non DC.

Nile Land. Abyssinia, *Quartin Dillon and Petit! Schimper!*

2. **A. muricatum,** *Hochst. in Hb. Schimp. Abyss.* ii. n. 732. Suffruticose, branched from the woody stock. Branches erect or ascending, subterete or obtusely 4-sided, puberulous towards the extremities, wiry, 1–1½ feet long. Leaves linear or linear-oval, narrowed to a subsessile base, apiculate, rather scabrid above, paler beneath, 1-nerved, ⅓–¾ in. long, margins revolute; stipules short, broad, truncate, 4-cuspidate. Flowers small. Calyx-lobes 1 or 2 produced, leaf-like. Fruit puberulous.—A. Rich. Fl. Abyss. i. p. 345.

Nile Land. Abyssinia, Adoa, *Schimper!*

3. **A. asperuloides,** *Hook. f. in Journ. Linn. Soc. Lond.* vi. 11; *et* vii. 197. A small tufted undershrub, 6 in. high. Branches flexuose, intertwining, woody below, wiry and puberulous above. Leaves linear or linear-oval, pointed or usually mucronate, fasciculate, somewhat narrowed to the very short dilated petiole, glabrescent, $\frac{1}{6}$–$\frac{1}{3}$ in. long, margins revolute, slightly scabrid; stipules short, truncate, 4-cuspidate, cusps subulate. Flowers tetramerous. Ovary hairy. Fruit at length glabrous.

Upper Guinea. Fernando Po, at the top of Clarence Peak (10,000 feet elevation), *Mann!* Cameroon Mountains, at elevation of 12,000 feet, *Mann!*

70. DIODIA, Gronov.; Benth. et Hook. f. Gen. Pl. ii. p. 143.

Calyx-tube obovoid or oval or oblong; limb 4–6-partite or disepalous, persistent; segments coriaceous, sometimes with minute intervening teeth. Corolla funnel-shaped, membranous, usually tetramerous, white; throat glabrous or hairy; lobes short, valvate in æstivation. Stamens usually 4, glabrous, inserted on the throat of the corolla, exserted; filaments slender; anthers linear-oblong, fixed at the back near the middle, spreading. Disk inconspicuous. Ovary usually 2-celled; style exserted, slender, bidentate at the tip; stigma subcapitate; ovules solitary, inserted at the middle of the septum, amphitropous. Fruit usually dicoccous; cocci plano-convex, crustaceous or corky, smooth or furrowed on the back, both indehiscent. Seeds oblong; embryo straight, cotyledons broad, radicle terete, inferior.—Decumbent or climbing weedy herbs with elongated or rambling branches, often with abbreviated branches in the axils, sessile or subsessile opposite leaves, short sheathing 3–6-setose stipules and axillary small sessile or subsessile solitary or verticillate flowers.

A genus of several species scattered over the tropics and warm regions of America and the West Indies as well as in Africa.

Calyx-limb dimerous.	
Leaves linear	1. *D. Kirkii.*
Leaves oval	2. *D. rubricosa.*
Calyx-limb tetramerous.	
Leaves subulinear. Glabrous	3. *D. arenosa?.*
Leaves oval or elliptical, spreading. Branches glabrous scabrous or pubescent.	
Flowers usually solitary	4. *D. maritima.*
Flowers usually several together, verticillate	5. *D. breviseta.*
Calyx-limb usually hexamerous	6. *D. vaginalis.*

1. **D. Kirkii,** *Hiern.* Branches subterete, glabrate below, bifariously puberulous above. Leaves narrowly linear, somewhat narrowed at both ends, sessile, glabrous, $\frac{3}{4}$–$1\frac{1}{4}$ in., margins revolute, lateral veins obsolete; stipules sheathing, puberulous, shortly 5–6-setose, setæ unequal, puberulous. Flowers sessile, a few together, tetramerous. Calyx-lobes 2 of a moderate size, persistent opposite, the others obsolete represented by puberulous tufts. Stigma subcapitate. Fruit $\frac{1}{8}$ in. long, puberulous above.

Mozamb. Distr. Mouth of West Luabo, *Kirk*

2. **D. rubricosa,** *Hiern.* Glabrous, almost shrubby below, rigid. Branches subterete, somewhat compressed towards the extremities, reddish brown. Leaves oval, obtuse, apiculate, wedge-shaped at the base, rather thick, ¾–1¼ by ½–¾ in., midrib and about 4 pairs of lateral veins impressed on the upper surface; stipular sheath about $\frac{1}{10}$ in. deep, tipped with 3 about equally long setæ. Flowers solitary, nearly ½ in. long, sessile, axillary. Calyx ¼ in. long; limb consisting of 2 foliaceous elliptical lobes ⅛ in. long. Corolla-tube very slender, nearly ¼ in. long; lobes 4, elliptical, ⅛ in. long.

Upper Guinea. Sierra Leone, *Hb. Afzelius!*

3. **D. arenosa?,** *DC. Prodr.* iv. p. 564. Glabrous, decumbent; branches ascending, scarcely a foot high. Leaves sublinear, more or less narrowed at both ends, sessile, scabrous above and on the margin, 1–2½ by ⅙–⅓ in., lateral veins obsolete; stipules truncate, sheathing, short, 3–5-setose at the apex; setæ narrowly subulate, equalling or rather exceeding the sheath. Flowers several together, small. Calyx-lobes 4, lanceolate-subulate, longer than the tube.—Benth. in Hook. Niger Fl. p. 423.

Upper Guinea. Sierra Leone?, *G. Don!*

I have not seen the type of this Brazilian species, and only follow Mr. Bentham in doubtfully referring Don's plant to it.

4. **D. maritima,** *Thonn. in Schum. Beskr. Guin. Pl.* p. 75. A creeping or decumbent herb, with long trailing glabrate quadrangular or rarely subterete branches, rising about 1 foot high, leafy towards the extremities. Leaves oval, subapiculate, rounded or subobtuse at the subsessile base, smooth and shining above or scabrid on both sides and on the margin, rigid (at least in the dry state), ranging up to 1–1½ by ½–¾ in., lateral veins about 4–5 pairs, impressed above, making an acute angle with the impressed midrib; stipules short, broad, truncate, connecting the base of the leaves or short petioles, usually 5-setose. Flowers sessile or subsessile, usually solitary, tetramerous, ⅓ in. long. Calyx green; lobes in fruit ⅛–⅙ in. long, lanceolate-oblong, glabrous or scaberulous on the margin; intermediate teeth minute, subulate. Corolla white; lobes oval or somewhat lanceolate. Stigma subcapitate. Fruit glabrous, ⅕–¼ in. long exclusive of the calyx-limb.—*Diodia foliosa,* Wawra et Peyritsch, Sert. Beng. p. 39.

Upper Guinea. On sandy coasts of Guinea, *Thonning, Capt. Babington!* Bananas, Sierra Leone, *Afzelius! Smeathman!* Senegambia, *Perrottet and Leprieur, Heudelot!* Goree, *Hb. Mus. Brit.;* on the Nun River, *Th. Vogel! Mann!* Brass, *Barter!* Old Calabar, *W. G. Milne!*

Lower Guinea. Banana, Congo, *Monteiro! Chr. Smith!* Loango, *Soyaux!* Benguella, *Wawra.*

De Candolle in Prodr. iv. p. 594 refers *Spermacoce commutata,* Schult. from Porto Rico and *S. serrulata,* Beauv. from Warree, as varieties of this species.

Occurs also in Cuba, Guatemala, etc.

5. **D. breviseta,** *Benth. in Hook. Niger Fl.* p. 424. A trailing or scandent herb of many feet in length, with quadrangular often scabrid branches. Leaves elliptical, somewhat narrowed at both ends sub-

sessile, scabrous especially above, ranging up to 1–2 by ½–1 in., lateral veins about 4–5 pairs, making an acute angle with the midrib, margins scabrid-rugose or subserrulate; stipules of usually 5 slender setæ rather shorter than the fruit arising from a short truncate base. Flowers sessile or subsessile, several or few together, tetramerous. Calyx green. Corolla white. Fruit ⅛–⅙ in. long.—*Spermacoce serrulata*, P. Beauv. Fl. Owar. p. 39, t. 23; *? Diodia littoralis*, Wawra and Peyritsch Sert. Beng. p. 39 (1860).

Upper Guinea. Sierra Leone, *Afzelius!* Fernando Po, *Th. Vogel! Mann!* Niger Expedition at Nupe, *Barter!* Lagos, *Barter!* Cape Coast, *Brass!*
Nile Land. Niamniam-land, at Boddo, *Schweinfurth!*
Lower Guinea. Congo, *Chr. Smith!* Benguella, *Wawra.*
Mozamb. Distr. Zanzibar Island, *Kirk! Hildebrandt!*
Occurs also in Madagascar, the West Indies, Guyana, Panama, etc.
Apparently identical with *Diodia scandens* and *D. sarmentosa* of Swartz.

6. **D. vaginalis,** *Benth. in Hook. Niger Fl.* p. 424. A glabrous stiff herb with procumbent leafy branches. Leaves linear or linear-oblong, somewhat pointed at the apex, scarcely narrowed at the sessile base, rigid, scabrous on the margin, 1–1½ by ⅙–⅓ in., lateral veins obsolete; stipules truncate, short, with 3 subulate rigid setæ, connate and sheathing below. Flowers solitary, sessile. Calyx-lobes about 6. Corolla ½ in. long.

Upper Guinea. Sierra Leone, *Afzelius!* at Grand Bassa and on the Nun, creeping on the sands, *Th. Vogel!* Brass, *Barter!*

71. GAILLONIA, A. Rich.; Benth. et Hook. f. Gen. Pl. ii. p. 144.

Calyx-tube oblong or oval; limb consisting of 2 foliaceous teeth or various, persistent. Corolla elongate funnel-shaped or shortly salver-shaped; throat naked; lobes 4–5, ovate, spreading, valvate in the bud. Stamens 4–5, inserted at the throat of the corolla; filaments short, some sometimes almost obsolete; anthers oblong. Disk inconspicuous. Ovary 2-celled; style slender, with 2 short linear lobes; ovules solitary, attached about the middle to the septum, amphitropous. Fruit dicoccous, oblong; cocci indehiscent. Seeds oblong, subterete, marked with a longitudinal furrow on the ventral face; umbilicus ventral; radicle elongated, inferior.—Small rigid undershrubs with small opposite linear or subulate sessile leaves, sheathing usually bisetose stipules adnate to the base of the leaves, and small sessile or subsessile flowers spicate in dichotomous cymes or axillary and terminal.

A genus of a few species extending from North Africa to North West India.

Besides the following species, there is in the Kew Herbarium a small specimen, probably obtained in Tropical Africa, from Dr. Livingstone's Memorandum book, apparently belonging to this genus; it is without leaves and seems to be an undescribed species.

1. **G. calycoptera,** *Jaub. et Spach, Illustr. Pl. Or.* i. p. 147, t. 80. A rigid virgately branched undershrub, woody at the base, 1–2 feet high, nearly glabrous. Branches terete, slender, canescent.

Leaves narrowly linear, rather fleshy, sessile, $\frac{1}{4}$–1 in. long, margins revolute; sheaths of the stipules very short, setæ usually 2 or of the lower leaves obsolete, short. Flowers about $\frac{1}{5}$–$\frac{1}{4}$ in. long, subsessile, solitary or few together, sheathed at the base by a pale calyx-like shortly 6-cleft involucre of $\frac{1}{8}$–$\frac{1}{6}$ in., arranged in simple and alternately branched terminal spikes; teeth of the involucre ovate, subacute. Calyx-teeth 2, foliaceous, pale, elliptical, narrowed at both ends, $\frac{1}{8}$ in. long; the 2 other teeth minute or obsolete. Corolla shortly salver-shaped, exceeding the calyx; lobes 4 rarely 5, rather small. Stamens 4–5, 2–3 with short filaments, the other 2 subsessile. Style as long as the corolla-tube, glabrous, bifid with short slender lobes. Fruit, including the calyx-teeth, $\frac{1}{4}$–$\frac{1}{3}$ in. long.—*Spermacoce calyptera*, Decaisne in Ann. Sc. Nat., Sér. ii., ii. p. 267.

Nile Land. Soturba, Coast of Nubia, *Schweinfurth!*
Occurs also in Arabia Petræa.

72. SPERMACOCE, Dill.; Benth. et Hook. f. Gen. Pl. ii. p. 145.

Calyx-tube campanulate or turbinate, often compressed; limb usually of 4–2 more or less conspicuous teeth and sometimes of small intermediate ones, more or less persistent. Corolla funnel-shaped or salver-shaped, membranous; tube short or elongated; throat naked or bearded at the base; lobes usually 4, rarely 3 or 2, spreading, valvate in the bud, often setulose at the apex. Stamens 4, rarely 3 or 2, inserted at the top of the corolla-tube, usually glabrous; filaments slender; anthers oval-oblong or oblong, usually rather short, fixed at the back, usually exserted. Disk cushion-shaped or obsolete. Ovary 2-celled; style slender, equalling the corolla-tube or exserted; stigma subcapitate, bilobed; ovules solitary, attached to the middle of the septum, amphitropous. Fruit small, dicoccous, splitting down the middle from the apex; cocci 1-seeded, one or both dehiscing at the apex. Seeds oblong; umbilicus ventral, longitudinally furrowed on the face; testa shining; albumen hard; radicle inferior.—Herbs usually annual, occasionally undershrubs, with opposite sessile or subsessile leaves, shortly sheathing stipules adnate to the base of the leaves truncate and tipped with setæ, and usually small densely verticillate or capitate hermaphrodite flowers in terminal and axillary clusters.

A large genus, tropical and subtropical, the greater number of the species found in America.

Leaves at the base of the flower-heads spreading or rarely reflexed. Annual herbs.
- Bracteoles not numerous nor conspicuous, or plant very slender.
  - Calyx-teeth all small, obscure (or sometimes 2–1 prolonged, subulate) . . . . . 1. *S. tenuissima.*
  - Calyx-teeth 4, subequal, not very small.
    - Corolla-tube exceeding the calyx-teeth.
      - More or less hirsute, very slender . . . . . 2. *S. filiformis.*
      - Hispid-hirsute, not very slender . . . . . 3. *S. Phyteuma.*
      - Glabrous, not very slender . . . . . 4. *S. compressa.*

Corolla-tube short, not exceeding the calyx-teeth.	
Margins of the leaves not whitish, more or less scabrous.	
Leaves ovate or ovate-lanceolate. Flowers very small	5. *S? pilosa.*
Leaves lanceolate or elliptical. Flowers ¼ in. long	6. *S. senensis.*
Leaves linear or nearly so.	
Capsule small, not more than ⅛ in. long. Branches glabrous or nearly so.	
Calyx-teeth sublinear. Capsule glabrous or puberulous	7. *S. stricta.*
Calyx-teeth linear-spathulate or (in the variety) subulate. Capsule pubescent	8. *S. hebecarpa.*
Capsule about ¼ in. long. Branches pubescent or hirsute-hispid.	
Setæ of the stipules as long as the sheath	9. *S. leucadea.*
Setæ of the stipules exceeding the sheath	10. *S. stachydea?*
Margins of the leaves whitish, not scabrous	11. *S. radiata.*
Calyx-teeth 2 as long as the ovary, 2 others slender or very small or obsolete.	
Corolla-tube very short. Nearly glabrous	12. *S. ramisparsa.*
Corolla-tube equalling the longer pair of calyx-teeth.	
Hispid-hirsute	13. *S. Ruelliæ.*
Bracteoles numerous, conspicuous. Plant not very slender.	
Stem and branches hispid. Corolla-tube exceeding the calyx-teeth	14. *S. dibrachiata.*
Stem and branches glabrous. Corolla-tube about as long as the calyx-teeth.	
Leaves somewhat hispid beneath	15. *S. Kotschyana.*
Leaves glabrous	16. *S. compacta.*
Leaves at the base of the flower-heads reflexed or obsolete.	
Undershrub	17. *S. globosa.*

1. **S. tenuissima,** *Schweinf. mss. in herb.* sub Borreriâ. A very slender glabrous annual, branched above the base. Branches smooth. Leaves narrowly linear, acute, sessile, rigid, sparingly scabrous, ½–1 in. long; stipules with 1–4 short setæ about equalling the sheath. Flowers tetramerous, a few together, in small sessile heads terminal and in the upper axils, mixed with small slender bracteoles; heads usually based by 2 spreading decussating pairs of leaves. Calyx-limb ciliate obscurely-toothed; teeth subulate, all short or sometimes 1–2 prolonged. Corolla pale purplish; tube purplish, slender, exceeding the setæ of the stipules. Capsule puberulous at the apex, small, splitting down from the apex.

Nile Land. Djurland, *Schweinfurth!*

Habit of slender states of *Octodon filifolium*, Schum. et Thonn., but calyx-teeth different.

2. **S. filiformis,** *Hiern.* A very slender unbranched erect annual, ranging up to 2 feet high, more or less hirsute. Stem subterete below, marked with narrow raised lines, compressed above. Leaves linear, acute, wedge-shaped at the sessile base, ½–1½ in. long; stipules with cup-shaped hirsute sheath and 2–5 setæ equalling or rather longer than it. Flowers tetramerous, white, delicate, several together, verticillate, forming small heads in the upper axils and terminal, usually based by

2 pairs of spreading leaves; bracteoles not numerous. Calyx-teeth 4, subequal, glabrous, slender, as long as the ovary. Corolla-tube exceeding the calyx-teeth. Ovary glabrous.

Upper Guinea. Niger Expedition, at Nupe, in rocky places, very abundant, *Barter!*

3. **S. Phyteuma,** *Schweinf. mss. in herb.* A stiff erect hispid-hirsute annual, somewhat branched, nearly 2 feet high. Stem and branches subterete below, obtusely 4-sided about the middle, subcompressed towards the apex. Leaves linear-lanceolate or linear-apiculate, wedge-shaped towards the base, sessile, scabrous above and on the revolute margin, $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{3}$ in., lateral veins inconspicuous; sheath short, with about 3–5 setæ, the middle seta about $\frac{1}{8}$–$\frac{1}{5}$ in. long. Flowers about $\frac{1}{3}$ in. long, numerous, sessile, crowded in dense heads of $\frac{2}{3}$–$\frac{5}{6}$ in. diameter, terminal and in upper axils, based by 1–3 pairs of leaves the stipules of which are not much dilated; bracteoles subpaleaceous, cleft, shorter than the calyx. Calyx-teeth 4, subequal, linear-subulate, scabrid-ciliate, longer than the glabrous ovary. Corolla pale purple, elongate-funnel-shaped; tube rather longer than the calyx-teeth; throat bearded with short thick hairs. Anthers oblong, much exserted; filaments long, puberulous. Style long, puberulous; stigma small, capitate.

Nile Land. Djurland, *Schweinfurth!*

4. **S. compressa,** *Afzelius mss. in herb.; non R. Br.* A glabrous erect simple or branched annual, 1–2 feet high. Stem and branches subterete at the base, obtusely 4-sided above, more or less compressed, sulcate. Leaves linear or narrowly elliptical, acute, slightly scabrous, $1\frac{1}{2}$–4 in. long, narrowed towards the base except the floral ones, sessile; stipules with about 4 or more setæ about as long as the sheath. Flowers $\frac{3}{8}$–$\frac{1}{2}$ in. long, several together, verticillate, in small terminal and axillary heads, based by 1–2 or more pairs of spreading leaves; bracteoles wanting or small. Calyx-teeth 4, lanceolate-subulate, ciliolate or scabrid, rather long in flower. Corolla-tube long, slender, twice exceeding the calyx-teeth. Anthers dark blue, exserted. Capsule puberulous towards the apex. Style purplish; stigma yellowish. Fruit $\frac{1}{6}$ in. long, glabrous, somewhat turbinate, tipped with the persistent calyx-teeth of $\frac{1}{10}$ in.

Upper Guinea. Sierra Leone, (flowers quite white) *Afzelius! Purdie!* Niger Expedition, at Nupe (flowers pale lilac), *Barter!*

5. **S.? pilosa,** *DC. Prodr.* iv. p. 553. Herbaceous. Stem and branches 4-sided, pubescent towards the extremities, puberulous below. Leaves ovate or ovate-lanceolate, pointed, shortly narrowed to a subsessile base, scabrous above with depressed veins, hispidulous beneath, $\frac{1}{2}$–2 in. long.; stipules with short truncate sheath and 3–5-setulose setæ of about $\frac{1}{8}$ in. long. Flowers very small, verticillate, many together; clusters axillary and subterminal, exceeded by the spreading floral leaves, sessile or (by exception) on short peduncles. Calyx-teeth 4, ovate or lanceolate, subequal or not very unequal,

equalling or exceeding the ovary, shortly hairy, spreading. Corolla white, funnel-shaped; tube very short.—*Diodia pilosa*, Schum. et Thonn. Beskr. Guin. Pl. p. 76.

Upper Guinea. Guinea, Aquapim, *Thonning*; (? Sierra Leone, *Th. Vogel*).

6. **S. senensis,** *Hiern.* Herbaceous. Branches subterete or obtusely 4-sided, somewhat compressed towards the extremities, of a straw colour, pubescent. Leaves lanceolate or elliptical, narrowed towards both ends, sessile, more or less scabrous and hairy above with depressed veins, somewhat hairy beneath, 2–3 in. long; stipules with a short hairy sheath and 5–7 longer setulose setæ. Flowers white, $\frac{1}{4}$ in. long, several together, verticillate; heads $\frac{1}{2}$ in. diam., sessile in the upper axils, based by 1–2 pairs of leaves; bracteoles straw-coloured or reddish, falling short of the calyx-teeth. Calyx-teeth, 4, subequal, lanceolate-subulate, somewhat hairy, as long as the ovary. Corolla-tube about equalling the calyx-teeth. Anthers just exserted. Capsule straw-coloured, $\frac{1}{8}$–$\frac{1}{6}$ in. long, somewhat hairy near the apex; seeds about as long.—*Diodia senensis*, Klotzsch in Peters Mossamb. Bot. p. 289.

Mozamb. Distr. Rios de Senna, Tette, *Peters!* Zambesi-land, *Stewart!* between Tette and the coast, and Manganja country near Soche hill, at elevation of 3,000 ft., *Kirk!*

Difficult to distinguish from *Hypodematium sphærostigma*, A. Rich, except in fruit; the flowers are moreover rather smaller.

Var. *angustifolia*, Aschers. ex Schweinf. Beitr. Fl. Æthiop. p. 245. Leaves sublinear, 2 by $\frac{1}{6}$ in.

Nile Land. By the Upper White Nile, *v. Harnier!* (a poor specimen which should be compared with *Hypodematium sphærostigma*, A. Rich).

7. **S. stricta,** *Linn. f. ? Suppl. Sp. Pl.* p. 120 (1781), *non Linn. Hb.* A glabrous annual, simple or somewhat branched ranging up to 18 in. high. Stem and branches slender, subterete below, marked with veined lines above. Leaves linear, narrowed at both ends, slightly scabrid, 1–1$\frac{1}{2}$ in. long, sessile. Flowers small, numerous, verticillate, in small terminal and axillary heads of $\frac{1}{6}$–$\frac{1}{3}$ in. diam., based by 1–3 pairs of spreading or at length reflexed leaves; bracteoles slender, falling short of the calyx-teeth. Calyx-teeth 4, subequal, subulate, puberulous, shorter than the fruit. Corolla-tube very short. Capsule puberulous at the apex or rarely glabrous, small, dehiscing widely.

Upper Guinea. Sierra Leone, *Afzelius! Purdie!*

Nile Land. Ukidi Forest, on low sandy ground, 2–3° N. lat. *Speke and Grant!*

Mozamb. Distr. Near 'Expedition Island.' *Kirk!* (*S. natalensis*, Hochst.; a variety with glabrous more obtuse calyx-teeth, perhaps a distinct species.)

A common tropical weed, at least in the Old World.

8. **S. hebecarpa,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 89, *non DC.* A rather slender, erect, subsimple or branched annual, ranging up to 18 in. high. Stem and branches glabrous or nearly so, somewhat 4-sided or narrowly 4-keeled. Leaves linear, narrowed at both ends, sessile, stiff, glabrous or nearly so, scabrid on the margins, glaucescent beneath, ranging up to 2 by $\frac{1}{5}$ in.; stipules with a hairy sheath, $\frac{1}{8}$–$\frac{1}{6}$ in. long and 3–5 equalling or rather longer setæ. Flowers slender,

several together, in terminal and axillary somewhat leafy and sessile heads of $\frac{1}{4}$–$\frac{1}{2}$ in. diam., based by the dilated sheaths of the stipules of 1–3 pairs of leaves; bracteoles subulate. Calyx-teeth 4, subequal, linear-spathulate, rather shorter than the pubescent fruit. Corolla-tube slender, short.—*Borreria hebecarpa*, Hochst. in Hb. Schimp. Abyss. iii. n. 1712 (1840); A. Rich. Fl. Abyss. i. p. 347.

Upper Guinea. Niger Expedition, at Nupe, *Barter!* (common in moist crevices of rocks, flowers reddish white).

Nile Land. Abyssinia, *Schimper! Hildebrandt!* Gallabat, *Schweinfurth!* Djurland, *Schweinfurth!*

? Var. *major*, Schweinf. in Herb. Gallab. n. 1479. Coarser, more robust, $1\frac{1}{2}$–2 ft. high. Leaves ranging up to 3 by $\frac{1}{2}$ in. Bracteoles very numerous, exceeding the subulate calyx-teeth.

Nile Land. Gallabat, *Schweinfurth!* Perhaps a distinct species.

Borreria neglecta, A. Rich. Fl. Abyss. i. p. 347, appears to be a dwarf state of *S. hebecarpa*, Oliv.; I have seen no authentic specimen.

9. **S. leucadea,** *Hochst. in Hb. Kotsch. Nub. n.* 259 (1841). Erect annual, hispid-hirsute with whitish hairs, but little branched. Stem and branches obtusely 4-sided, subterete below, somewhat compressed above. Leaves linear or lanceolate, acute, narrowed towards the sessile base, scabrous above, 1–$2\frac{1}{4}$ by $\frac{1}{5}$–$\frac{1}{2}$ in.; stipules with a sheath of about $\frac{1}{6}$ in. long and about 5 equalling setæ, pale yellowish. Flowers small, several together, verticillate and capitate, in terminal and axillary sessile bracteate or leafy heads of $\frac{1}{2}$–$1\frac{1}{4}$ in. diam. Calyx-teeth 4, of nearly the same length, lanceolate, longer than the ovary, shorter than the fruit, persistent, hairy. Corolla-tube short. Capsule about $\frac{1}{4}$ in. long, hairy above; seeds nearly as long.

Nile Land. Cordofan, in savannahs, *Kotschy!*

10. **S. stachydea ?,** *DC. Prodr.* iv. p. 554. A robust branched annual, 2 feet high or more. Stem and branches obtusely 4-sided, pubescent. Leaves linear or linear-elliptical, narrowed towards both ends, sessile, scabrous, 3–5 by $\frac{1}{4}$–$\frac{1}{2}$ in., lateral veins depressed on the upper surface; stipules with tomentellous sheath and 6 or more longer setæ. Flowers pale blue, numerous, crowded in terminal or subterminal sessile leafy heads of $\frac{1}{2}$–1 in. diam.; bracts ovate or lanceolate, subfoliaceous; bracteoles slender, falling short of the calyx-teeth. Calyx-teeth 4, lanceolate-subulate, shortly hirsute-pubescent outside, equalling the ovary. Corolla-tube about equalling the calyx-teeth. Fruit shortly pubescent above, nearly $\frac{1}{4}$ in. long exclusive of the persistent calyx-teeth.

Upper Guinea. Niger Expedition, at Nupe, *Barter!*
North Central. Bakel, *Leprieur* ex DC. *l. c.*
I have not seen the type of De Candolle's species.

11. **S. radiata,** *Sieber, Pl. Seneg. exsicc.* n. 8. A hirsute stiff erect annual, 1–2 feet high. Stems and branches subterete below, somewhat angular above. Leaves linear, narrowed towards both ends, acute, rigid, spreading, sessile, nearly glabrescent above, more or less hispid on the prominent midrib beneath, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, lateral veins

obsolete, margins subrevolute, white, minutely scabrous; stipules short, truncate, terminated by 7–9 long slender stiff setæ of $\frac{1}{4}$–$\frac{1}{3}$ in. Flowers capitate, white, small, numerous, in hemispherical dense clusters of $\frac{1}{2}$–1 in. diam. terminating the stem and branches as well as the short lateral shoots. Calyx hairy above; teeth 4, subequal, slender, hairy, rather shorter than the compressed ovary. Corolla funnel-shaped; tube short. Anthers oval, shortly exserted. Style glabrous, bifid at the tip.—*Borreria radiata*, DC. Prodr. iv. p. 542.

Upper Guinea. Senegambia, *Sieber! Perrottet & Leprieur, Heudelot!* Niger Expedition, *Baikie!* at Nupe, *Barter!*

Nile Land. Cordofan, in sandy savannahs at Mount Kohn, *Kotschy!* Djurland, *Schweinfurth!*

12. **S. ramisparsa,** *Pohl ex DC. Prodr.* iv. p. 544. A branched or subsimple annual weed; stem and branches erect or decumbent, mostly weak, nearly glabrous or scattered with short hairs usually arranged in longitudinal rows. Leaves oval, obtuse or pointed, more or less wedge-shaped at the base, submembranous, nearly glabrous, often ciliolate, rather paler beneath, $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{5}{8}$ in. subsessile or shortly petiolate, veins slender; stipules with a short broad sheath and about 5 short setæ equalling or rather longer than it. Flowers white, very small, several together, verticillate, in small dense axillary and terminal clusters; bracteoles slender-subulate, nearly as long as the ovary. Calyx-tube glabrous; teeth 2, obtusely subulate, nearly glabrous, as long as the ovary; the 2 other teeth minute or obsolete; limb ciliolate. Corolla-tube very short. Anthers included. Style very short, with 2 short arching branches.—*Borreria ramisparsa*, DC. l. c.; *S. ocymoides*, Baker Fl. Maurit. p. 159; vix Burm.

Upper Guinea. Sierra Leone, *Afzelius!* Island St. Thomas, *G. Don!* Senegambia, *Heudelot! Bidjem!* Quorra, *Th. Vogel!* Onitsha, *Barter!*

A common tropical weed, occurring also in the Mascarene Islands.

13. **S. Ruelliæ,** *DC. Prodr.* iv. p. 554. A hispid-hirsute herb with ascending 4-sided branches. Leaves narrowly elliptical or sublinear, apiculate, sessile, scabrid above, somewhat hispid-hirsute beneath, $\frac{2}{3}$–3 by $\frac{1}{6}$–$\frac{2}{3}$ in., midrib and lateral veins slender. depressed on the upper surface; stipules with very short sheath and about 7 slender setæ of $\frac{1}{6}$–$\frac{1}{4}$ in. Flowers small, several together, verticillate in the axils and terminal, overtopped by the leaves of the abbreviated axillary shoots; clusters sessile; bracteoles subulate. Calyx with 4 hirsute teeth, 2 teeth lanceolate (longer than the ovary), persistent, opposite the cocci, the other 2 teeth shorter than the former pair, subulate or lanceolate. Corolla white, salver-shaped; tube equalling the longer calyx-teeth.—Cfr. *S. palmetorum*, DC. l. c. p. 553 et *Diodia scabra*, Schum. et Thonn. Beskr. Guin. Pl. p. 76 (1827).

Upper Guinea. Sierra Leone, *Afzelius* (Herb.)! *Smeathman! Th. Vogel! Morson! Barter!* Senegambia, *Perrottet et Leprieur, Heudelot!* Dahomey, *Burton!* Abbeokuta, *Dr. Harrison!* Niger Expedition, *Barter! Ansell!* Quorra, *Th. Vogel!* Accra, *Th. Vogel! G. Don!* Guinea, *Thonning.*

North Central. Bakel, *Leprieur* ex DC.

Nile Land. At Ukidi, *Speke et Grant!* (*Mitracarpum*, sp. n. 1, Thoms. in Speke, Journ. App. p. 636; *Spermacoce hebecarpa*?, Oliv. in Trans. Linn. Soc. Lond. xxix. p. 89); Djur-land, ('Spermacoce ampliata.') *Schweinfurth!*

Lower Guinea. Congo, *Chr. Smith!*

Occurs also at Delagoa Bay and Madagascar.

14. **S. dibrachiata,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 87, t. 52. A rigid branched or subsimple annual herb, 9–18 in. high. Stem and branches hispid with white hairs. Leaves lanceolate, subacute, somewhat narrowed at the sessile base, rigid, rugose above, scabrous on the midrib and revolute margin beneath, 2–3 by $\frac{1}{4}$–$\frac{1}{2}$ in., lateral veins inconspicuous; stipules with long hispidulous sheath and about 3 setæ about the same length. Upper internodes usually long. Flowers $\frac{1}{2}$–$\frac{3}{4}$ in. long, very numerous, densely packed in terminal and subterminal sessile heads, based by the dilated stipules of the uppermost leaves; bracteoles filiform, very numerous. Calyx-teeth 4, narrowly subulate, subequal, longer than the glabrous ovary, turning rigid. Corolla sky-blue or purple, salver-shaped; tube slender, glabrous except the tips of the lobes, exceeding the calyx-teeth. Anthers exserted, white. Stigma subcapitate, bilobed, exserted. Fruit dehiscing as in the type of the genus.—*Spermacoce*, sp. n. 2, T. Thoms. in Speke, Journ., App. p. 636.

Nile Land. Karagué, alt. 5000 ft. *Speke & Grant!*

Mozamb. Distr. Manganja hills, alt. 3000 ft. *Kirk! Meller!* Zambesi-land, *Stewart!*

15. **S. Kotschyana,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 88, t. 53. Erect, not much branched, $\frac{1}{2}$–$1\frac{1}{2}$ feet high. Stem glabrous, subterete below, somewhat scabrous on the 4 angles above. Leaves linear, acute, sessile, scabrous above, somewhat hispid beneath, $1\frac{1}{2}$-3 in. long, the floral ones dilated at the base into the hairy stipular sheath which is tipped with about 5–7 longer setæ. Flowers small, numerous, crowded in dense verticillate terminal and axillary leafy and bracteate heads of 1 in. diam.; bracteoles linear-filiform, very numerous, pale reddish, exceeding the calyx-teeth. Calyx-teeth 4–3, subequal, subulate, ciliate with paleaceous hairs, as long as the ovary, rather shorter than the fruit. Corolla-tube about equalling the calyx-lobes; lobes 4–3, short. Fruit pubescent towards the apex.—*Spermacoce*, sp. n. 3, Thoms, in Speke, Journ., App. p. 636.

Nile Land. Madi, in low grounds near water, *Speke & Grant!* Sennaar, *Kotschy!*

16. **S. compacta,** *Hochst. in Hb. Kotsch. Nub.* n. 240 (1841). A glabrous, erect, simple or branched annual, 8–16 in. high. Stem marked with narrow raised lines. Leaves linear or narrowly oval, narrowed at both ends, 1–2 in. long, somewhat scabrous on the margins; the floral leaves dilated at the base into the glabrous or puberulous sheath of the stipules which are tipped with about 5 rather longer setæ. Flowers small, numerous, densely crowded in verticillate leafy sessile terminal and axillary heads of $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; bracteoles very numerous, paleaceous-filiform, exceeding the calyx-teeth. Calyx-teeth

4–3, subulate, equal, as long as the ovary, shorter than the fruit, not quite glabrous. Corolla-tube equalling the calyx-teeth; lobes 2–3. Capsule $\frac{1}{8}$ in. long, puberulous towards the apex.—Schweinf. Beitr. Fl. Æthiop. p. 139.

Nile Land. Cordofan, *Kotschy!* in sandy places; Abyssinia, *Ehrenberg.*

17. **S. globosa,** *Schum. et Thonn. Beskr. Guin. Pl.* p. 73, *non Pohl.* A small glabrous erect much branched under-shrub, 2–3 feet high. Branchlets 4-sided, often with abbreviated shoots in the axils. Leaves oblanceolate or narrowly elliptical, obtuse or somewhat pointed, attenuate at the base, subsessile or quasi-petiolate, $\frac{2}{3}$–$2\frac{1}{2}$ in., lateral veins inconspicuous; stipules truncate, short, 3–7-setose, setæ about as long as the connate portion. Flowers small, white, capitate, subsessile, numerous, in terminal and subterminal globose sessile clusters of $\frac{1}{4}$—$\frac{1}{2}$ in. diameter, based by the reflexed or obsolete pair of uppermost leaves. Calyx glabrous or nearly so; teeth 2, glabrous, clavate, not longer than the ovary, the two other teeth minute; tube minutely ciliate. Corolla-tube very short. Anthers oval-oblong, shortly exserted. Style glabrous, bifid at the tip; lobes arching.—*Bigelovia verticillata,* Spr. in Sieber, Pl. Seneg. exsicc. n. 10. *Borreria Kohautiana,* Cham. et Schlecht. in Linnæa iii. p. 311 (1828); DC. Prodr. iv. p. 541. *Spermacoce verticillata,* Linn. Sp. Pl., edit. i., p. 102, part. *Spermacoce* verticillis globosis, Dill. Hort. Eltham. p. 369, t. 277, f. 358 (1732).

Upper Guinea. Sierra Leone, *Afzelius! Th. Vogel!;* Cape Coast, *Brass;* Senegambia, *Boivin! Bidjem! Döllinger! Sieber! Brunner!;* Grand Bassa, *Th. Vogel!* Gambia, fide *Dillenius* l. c. Volta, *Thonning.*

Mozamb. Distr. East Coast of Africa, *Forbes!*

Occurs also in the Cape de Verde Islands, &c.

The following species remain unknown to me.

S. phyllocephala, DC. Prodr. iv. *p.* 553.

North Central? Kouma and Walo, *Perrottet et Leprieur.*

?Upper Guinea. Sierra Leone, *G. Don!* (a specimen in fruit in Hb. Mus. Brit., referred to the neighbourhood of this species by Bentham in Hook. Niger Fl. p. 423.)

S. galeopsidis, DC. Prodr. iv. *p.* 554.

Upper Guinea. Senegambia, at Dagana, in sandy places.

S. chætocephala, DC. Prodr. iv. *p.* 554.

North Central. At Bakel, in sandy places, *Leprieur.*

Nile Land. Ronga, White Nile, *Binder* (β. *brevifolia,* Kotschy Pl. Binder. p. 6). This species should be compared with *S. Kotschyana.*

73. HYPODEMATIUM, A. Rich. Fl. Abyss. i. p. 348 (1847).

Characters of *Spermacoce,* in which it is included by Bentham and Hooker, Gen. Pl. ii. p. 145, except that the fruit bursts round the base and splits up from the base into 2 cocci, remaining entire at the apex.

A monotypic genus, peculiar to this Flora.

1. **H. sphærostigma,** *A. Rich. Fl. Abyss.* i. p. 348. A branched or subsimple erect or decumbent annual weed, ranging up to $2\frac{1}{2}$ feet high; branches sparingly hirsute or nearly glabrous. Leaves lanceolate

or narrowly elliptical, narrowed to an acute or apiculate apex, wedge-shaped at the subsessile base, more or less scabrous above, rather paler and somewhat hairy beneath, ranging up to 4 by 1 in., margins scabrous, veins rather slender; stipules with a short broad sheath and about 5–7 equalling or longer setæ, hairy. Flowers ranging up to ½ in. long, numerous, crowded in dense sessile terminal and axillary heads, exceeded by the uppermost spreading leaves. Calyx-teeth 4, lanceolate, acute, ciliate, rather longer than the ovary; tube hairy above. Corolla elongate-funnel-shaped, glabrous except the tip of the lobes. Anthers exserted. Stigma subcapitate, bilobed. Fruit bursting around the base; cocci dehiscing upwards inside from the base leaving the septum free.—*H. ampliatum*, A. Rich. l. c. 349. *Mitracarpus sphærostigma*, Hochst. in Hb. Schimp. Abyss. i. n. 100. *M. ampliatus*, Hochst. l. c. iii. n. 1721. *Spermacoce ampliata*, Hook. f. ex Oliv. in Trans. Linn. Soc. Lond. xxix. p. 88, t. 54, excl. fig. 4–6. *S. sphærostigma*, Vatke in Linnæa xl. p. 196 (1876). *S. Ruelliæ*, T. Thoms. in Speke, Journ., App. p. 636 (1863), non DC.

Nile Land. Abyssinia, *Schimper! Hildebrandt! Quartin Dillon! Plowden!* Cordofan, *Kotschy! Cienkowsky* Gallabat, *Schweinfurth!* Unyoro, *Speke and Grant!*; Djur-land, *Schweinfurth!*

74. **OCTODON,** Thonn.; Benth. et Hook. f. Gen. Pl. ii. p. 145.

Calyx-tube turbinate or elongate, compressed; lobes of the short limb 4 or 8, rounded. Corolla funnel-shaped, membranous; throat glabrous; lobes 4, revolute, setulose at the tip, valvate in the bud. Stamens 4, inserted at the throat of the corolla, glabrous; anthers linear or oblong, fixed by the back. Disk inconspicuous. Ovary 2-celled; style filiform; stigma small, capitate; ovules solitary, attached below the middle of the septum. Fruit dicoccous. Seeds linear or oblong, erect, sulcate on the ventral face. Radicle inferior.—Annual erect herbs with opposite sessile narrow leaves, sheathing stipules adnate to the base of the leaves and terminated by 1 or several setæ, and small hermaphrodite flowers densely crowded in heads within the stipular sheaths of the upper leaves and surrounded by numerous filiform bracteoles.

A genus peculiar to this Flora.

Calyx-teeth 8. Anthers just exserted. Setæ of the stipules solitary (except of the floral leaves) . . . . . 1. *O. filifolium*.
Calyx-teeth 4. Anthers much exserted. Setæ of the stipules several . . . . . 2. *O. setosum*.

1. **O. filifolium,** *Schum. et Thonn. Beskr. Guin. Pl. p.* 74. Erect stiff annual, robust or slender, glabrous or very nearly so, 1–2 feet high, simple or branched. Stem and branches slender, subterete or at the apex somewhat compressed. Leaves filiform-subulate, sessile, 1½–4 in. long, adnate at the base to the sheath of the stipules, which is about ⅙–¼ in. long and is abruptly terminated on each side by a filiform seta of about the same length; floral stipules dilated, terminated by about 3 short subulate setæ. Flowers 10–20 together, crowded

within the stipular sheath of the uppermost leaves and again at the one or two next nodes; bracteoles filiform, slightly clavate, purplish at the apex. Calyx-teeth 8, small, dark purple. Corolla white; lobes 4, acute, bluish at the apex. Anthers white, just exserted.—*Spermacoce? filifolia*, Perr. et Lepr. ex DC. Prodr. iv. p. 540.

Upper Guinea. Gold Coast, *Thonning* on the Quorra, *Th. Vogel!* Senegambia, *Heudelot!* Cape Coast, *Brass!* Sierra Leone, *Afzelius!*

Nile Land. Djur-land, *Schweinfurth!*

2. **O. setosum,** *Hiern.* A nearly glabrous erect annual, simple or somewhat branched, about 2 feet high. Stem sulcate. Leaves elongate-linear, acute, sessile, spreading, $1\frac{1}{2}$–4 in. long, equalling or longer than the internodes, adnate at the base to the stipular sheath which is tipped on each side with 3–5 filiform setæ of $\frac{1}{3}$–$\frac{1}{2}$ in. in length. Flowers many together, crowded within the stipular sheaths of the uppermost leaves; heads terminal, solitary; bracteoles filiform, slightly clavate, fimbriate at the tip. Calyx-teeth 4, small, obtuse. Corolla pale lilac; lobes 4, lanceolate, as long as the tube. Anthers much exserted.

Upper Guinea. On the Quorra, *Barter!* at Nupe, *Barter!* Dahomey, *Consul Burton!*

75. RICHARDIA, Houst. ex Linn. Gen. Pl., ed. i. p. 100, (1737); non Kunth.

(Ricardia, Houst. Rel. p. 5, t. 9 (1781). Richardsonia, Kunth in Mém. Mus. Par. iv. p. 430 (1818); Benth. et Hook. f. Gen. Pl. ii. p. 147).

Calyx-tube obovoid; limb deeply 5–6-lobed, about as long as the ovary, at length deciduous. Corolla funnel-shaped, throat glabrous; limb spreading, 5–4-lobed; lobes ovate, setulose at the back near the apex, valvate in the bud. Stamens 5–4, shortly exserted, inserted on the throat of the corolla; filaments slender; anthers oblong, glabrous, fixed by the back. Disk inconspicuous. Ovary 3-celled; style filiform, shortly 3-cleft; stigmas 3, exserted, subcapitate, bifid or expanded; ovules solitary, attached to the septum at or below the middle. Fruit at length 3-coccous; cocci indehiscent, subcrustaceous, obovoid. Seeds obovoid, attached below the middle; radicle inferior.—Herbs more or less hispid, with opposite subsessile leaves, shortly sheathing truncate setose stipules adnate to the leaf-base, and small sessile hermaphrodite flowers arranged many together in sessile terminal heads.

A genus of a few species, wholly confined to America with the exception of the following species.

1. **R. scabra,** *Linn. Sp. Pl., ed.* i. *p.* 330 (1735). Hirsute-hispid, a few inches high; stem erect; branches spreading. Leaves oval or obovate, obtusely pointed, wedge-shaped at the base, slightly scabrous, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, veins inconspicuous; stipular sheath short, terminated by 3–5 setæ on each side. Flowers $\frac{1}{5}$ in. long. Fruit $\frac{1}{8}$ in. long.—*Richardsonia scabra*, St. Hil. Pl. Us. t. 8, cum syn.

Mozamb. Distr. Quilimane, *Kirk!*

Previously known only from tropical America.

76. **MITRACARPUM,** Zuccar. ; Benth. et Hook. f. Gen. Pl. ii. p. 146.

Calyx campanulate-turbinate ; limb of 4 teeth, of which 2 are much larger than the other pair, persistent. Corolla funnel-shaped, membranous ; throat not quite naked ; lobes 4, spreading, valvate in the bud. Stamens 4, glabrous, inserted at the top of the corolla-tube ; filaments short ; anthers oblong, fixed by the back. Disk annular, elevated. Ovary 2-celled ; style slender, with 2 short slender branches ; ovules solitary, peltately attached to the middle of the septum, amphitropous. Fruit subdidymous, bursting transversely round the middle ; seeds attached about the middle of the face and usually coming away with the upper part of the membranous pericarp, marked on the ventral face with a diagonally placed impressed cross. Radicle inferior. Testa pitted.—Herbs with opposite leaves, short truncate setose stipules adnate to the base of the leaves, and small hermaphrodite crowded verticillate flowers arranged in axillary and terminal heads.

A genus of moderate size, chiefly occurring in tropical America.

There is in the Kew Herbarium a specimen from the "South African gold-field," collected by T. Baines and received in 1871, which may or may not be tropical, and which apparently belongs to *Mitracarpum Dregeanum*, E. Mey., a species, however, which is perhaps rather a *Spermacoce*.

1. **M. scabrum,** *Zuccarini ex Schult. Mant. in Roem. et Schult. Syst. Veg.* iii. *p.* 210, *obs. sub n.* 69. A sturdy annual, almost suffruticose at the base, erect, branched, 1–2 feet high. Stem and branches subterete below, obtusely 4-sided above, subcompressed towards the apex, puberulous or glabrate. Leaves oval or oblong, obtuse or nearly so, wedge-shaped at the base, puberulous beneath or nearly glabrous except the finely scabrous margin, 1–2½ by ¼–1 in., subsessile, veins slender, not conspicuous ; setæ of the stipules 5–7, about as long as the sheath. Flowers white. Calyx-limb of 2 oblong or oblong-lanceolate obtuse or acute teeth and of 2 subulate smaller ones. Corolla-tube as long as the larger calyx-teeth. Bracteoles filiform, scarcely equalling the calyx-teeth.—*M. senegalense*, DC. Prodr. iv. p. 572. *M. verticillatum*, Vatke in Linnæa, xl. p. 196. *Staurospermum verticillatum*, Schum. et Thonn. Beskr. Guin. Pl. p. 73. *Oldenlandia verticillata*, Bacle ex DC. *l. c.* *Mitracarpum*, sp. n. 2, T. Thoms. in Speke, Journ., App. p. 636.

Upper Guinea. Senegambia, *Bacle, Perrottet and Leprieur, Roger!* Guinea, *Thonning ;* Sierra Leone, *Th. Vogel!* Accra, *G. Don!* Dahomey, *Consul Burton!* Niger Expedition, *Baikie!* at Nupe, *Barter!*

North Central. Kouka, *E. Vogel!* common in hedges at Udge, *E. Vogel!*

Nile Land. Nubia, Cordofan and Sennaar, *Kotschy!* White Nile, *Petherick!* and others ; Abyssinia, *Schimper!* Unyoro, *Speke and Grant!* Djur-land, *Schweinfurth!*

Lower Guinea. Congo, *Chr. Smith!*

Also in the Cape de Verde Islands.

77. **RUBIA,** Tourn. ; Benth. et Hook. f. Gen. Pl. ii. p. 149.

Calyx-tube subglobose ; limb obsolete. Corolla rotate or subcampanulate ; lobes 5, rarely 4, valvate in the bud. Stamens 5, rarely 4, inserted on the tube of the corolla ; filaments short ; anthers oblong. Disk shortly cushion-shaped. Ovary 2-celled or towards the base or

by abortion 1-celled. Style bilobed, short; stigmas subcapitate; ovules solitary, attached at the base of the septum, erect, amphitropous. Fruit didymous, fleshy, 2–1-celled. Seeds suberect, adhering to the pericarp; radicle inferior.—Scabrous herbs with verticillate quasi-exstipulate leaves and small flowers arranged in axillary and terminal cymes.

A genus of moderate size, occurring in the temperate and tropical regions of the world.

Leaves petiolate, usually cordate at the base.
- Corolla rotate. Leaves of the same colour on both surfaces . 1. *R. cordifolia.*
- Corolla subcampanulate. Leaves hoary-tomentose beneath . 2. *R. discolor.*

Leaves sessile, not cordate . . . . . [*R. tinctorum*].

1. **R. cordifolia,** *Linn. Syst. Nat., Edit.* xii. app. tom. 3, p. 229, *non Hochst.* A scabrous creeping perennial herb. Branches elongated, tetragonous. Leaves cordate-lanceolate or -ovate, acuminate or acute, submembranous, quaternate, petiolate, of the same colour on the two surfaces, 3–5-nerved, $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in. or larger; petioles about as long as the leaves or longer. Corolla rotate, 5–4-lobed.

Nile Land. Karagué, (red madder; clinging plant) *Speke and Grant!*
Occurs also in South Africa and is widely distributed in Asia.

2. **R. discolor,** *Turcz. Fl. Baical.-Dahur.* i. p. 528. A scabrous scandent perennial herb. Branches quadrangular, at length subterete. Leaves ovate-cordate, hoary-tomentose beneath, acuminate or apiculate, submembranous, quaternate, petiolate, 3–5-nerved, $\frac{1}{2}$–2 by $\frac{1}{3}$–$1\frac{1}{4}$ in.; petioles as long as the leaves or shorter. Corolla subcampanulate, 5-lobed.—*R. cordifolia,* Hochst. in Hb. Schimp. Abyss. i. n. 24; A. Rich. Fl. Abyss. i. p. 344; non Linn.; *R. Braunii,* Hochst. in Flora 1841, i. App. p. 27 (name only).

Nile Land. Abyssinia, *Schimper!* and others; Upper Nile, beyond $2\frac{1}{2}°$ N. lat.; fide Schweinf. et Ascher. Enum. p. 282. Abyssinian names "*Schankoeh,*" "*Schenenn,*" "*Sankka.*"

Rubia tinctorum, Linn., is cultivated in Abyssinian gardens for economic purposes.

78. **GALIUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 149.

Calyx-tube subglobose; limb obsolete. Corolla rotate; lobes 4, valvate in the bud. Stamens 4, inserted on the tube of the corolla; filaments short; anthers short, exserted. Disk annular. Ovary 2-celled; styles 2, short; stigmas subcapitate; ovules solitary, attached to the septum, amphitropous. Fruit didymous, coriaceous, smooth rugose or tuberculate, glabrous or hispid. Seeds suberect; embryo curved; radicle elongated, terete, inferior. — Annual or perennial herbs, with angular branches, verticillate quasi-exstipulate sessile leaves and small hermaphrodite or polygamous flowers arranged in ebracteate terminal or axillary cymes.

A large genus of many critical species widely scattered over the world.

Leaves 3-nerved, 4 in a whorl.
- Flowers yellow. Leaves ovate-elliptical, acuminate-apiculate . . . . . 1. *G. Biafræ.*
- Flowers white. Leaves oval, cuspidate-mucronate . . 2. *G. rotundifolium.*

Leaves 1-nerved, 6–9 in a whorl.
- Flowers white or greenish, in terminal panicles and in axillary cymes.

Stem branches and margins of leaves aculeate-scabrid. Fruit hispid with hooked hairs or rarely glabrous. Panicles not divaricately branched .	3. *G. Aparine.*
Stem and branches glabrous; margins of leaves finely scabrid. Fruit glabrous, subrugose. Panicles divaricately branched	4. *G. Mollugo.*
Flowers purplish, 3–4 together, or short peduncles terminating short axillary branches	5. *G. simense.*
Flowers purple in very divaricate slender terminal panicles; pedicels capillary	6. *G. Decaisnei.*

1. **G. Biafræ,** *Hiern.* Root slender, cæspitosely branched at the apex. Branches creeping or scandent, hispid-hirsute, quadrangular, rather slender, leafy. Leaves quaternate, ovate-elliptical, acuminate-apiculate, wedge-shaped at the base, setulose, 3-nerved, $\frac{1}{5}$–$\frac{1}{3}$ in. long. Flowers yellow, in terminal divaricately branched panicles. Fruit $\frac{1}{15}$ in. diam., densely setose-hispid, on straight divaricate pedicels of $\frac{1}{8}$–$\frac{1}{6}$ in.—*G. rotundifolium*, var. foliis acutioribus, Hook. f. in Journ. Linn. Soc. Lond. vi. p. 11 and vii. p. 197; non Linn.

Upper Guinea. Fernando Po, on the very top of Clarence Peak, *Mann!* Cameroon Mountains, 7–12,000 ft. alt., *Mann!*

2. **G. rotundifolium,** *Linn. Sp. Pl.*, ed. i., p. 108 (1753). Root creeping, perennial. Stems slender, flaccid, angular, ascending or prostrate, hispidulous. Leaves quaternate, oval, somewhat wedge-shaped at the base, obtuse and cuspidate-mucronate, 3-nerved, setulose on the margin and nerves, $\frac{1}{3}$–$\frac{3}{4}$ in. long. Flowers small, in terminal divaricately branched panicles. Corolla white. Fruit setose-hispid.—*G. dasycarpum*, Hochst. ex Schweinf. Beitr. Fl. Æthiop. p. 135.

Nile Land. Abyssinia, *Schimper!*
Occurs also in Europe, the Cape de Verde Islands, Natal, &c.

3. **G. Aparine,** *Linn. Sp. Pl.*, ed. i. p. 108, (1753). Annual, flaccid, scandent. Stem and branches quadrangular, aculeate-scabrid with short hairs directed downward or nearly glabrous, somewhat hirsute about the nodes. Leaves 6–9 in a whorl, sublinear or narrowly elliptical, attenuate towards the base, mucronate, 1-nerved, $\frac{1}{2}$–1 in. long, sometimes rather smaller, margins retrorsely aculeate. Flowers small; corolla ranging up to $\frac{1}{5}$ in. diam., white or greenish; the axillary peduncles rather longer than the leaves, the terminal ones subpaniculate. Fruit $\frac{1}{12}$–$\frac{1}{8}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. diam., beset with hooked bristles or rarely glabrous, on erect divaricate pedicels.

Nile Land. Abyssinia, *Petit! Schimper!*

The following varieties may prove to be distinct species, as indeed they have often been regarded.

Var. β. *Vaillantii* (DC.) Fruit smaller, usually glabrous. Whole plant also less.—*G. hamatum*, Schweinf. Beitr. Fl. Æthiop. 135 *fide* Vatke in Linnæa xl. p. 198, non Hochst.

Nile Land. Abyssinia, *Schimper* (ex Vatke).

Var. γ. *spurium* (L.) Fruit smooth, glabrous.—*G. Aparine* L., var. *hamatum*, Hook. f. in Journ. Linn. Soc. Lond. vi. p. 2, vii. p. 197. *G. simense*, Fresen. in Mus. Senckenb. ii. p. 165 (1837), non Hochst.

Upper Guinea. Fernando Po, *Mann !*; Cameroons Mountains, *Mann !*
Nile Land. Abyssinia, *Schimper !*

Var. δ. *hamatum.* Fruit somewhat tuberculate, not hispid or sparingly so.—*G. hamatum,* Hochst. in Hb. Schimp. Abyss. ii. n. 675 (1842); A. Rich. Pl. Abyss. i. p. 345.

Nile Land. Abyssinia, *Schimper !* i. n. 675, 1853. n. 610; 1862. n. 735, *Roth !*

This species is very widely spread over the world.

4. **G. Mollugo,** *Linn. Sp. Pl.*, ed. i., p. 107 (1753); var. (*G. erectum,* Huds.) Glabrous or very nearly so, perennial. Stems erect or ascending, slender, not tumid at the nodes. Leaves narrowly linear, 8–6 in a whorl, acute, about $\frac{1}{2}$ in. long, attenuate at the base, finely scabrid on the margin, 1-nerved. Flowers white, small, in small divaricately branched terminal panicles. Fruit very small, glabrous, subrugose, on short straight slender divaricate pedicels.

Nile Land. Abyssinia, *Schimper !*
Widely distributed over Europe, &c.

5. **G. simense,** *Hochst. in Hb. Schimp. Abyss.* ii. n. 548 (1842). Glabrous throughout, apparently annual, cæspitosely branched from the crown of the root. Branches decumbent or prostrate, a few inches or a foot long, angular. Leaves 6 in a whorl, sublinear, attenuate towards the base, mucronate, $\frac{1}{5}$–$\frac{1}{3}$ in. long, 1-nerved. Flowers purplish, 3–4 together on short peduncles terminating short lateral branches. Corolla $\frac{1}{7}$ in. diam. Fruit smooth, $\frac{1}{10}$ in. long, $\frac{1}{6}$ in. diam.—A. Rich. Fl. Abyss. i. p. 344; non Fresen.

Nile Land. Abyssinia, *Schimper !* Nubia, Soturba ex Schweinf. Fl. Sot. p. 17.

6. **G. Decaisnei,** *Boiss. Diagn., Ser.* I., 6, p. 69; β. *latifolium,* Boiss. Fl. Orient. iii. p. 77. Annual, glabrous or nearly so, 6–9 in. high, branched from the base, erect or decumbent. Branches very slender. Upper leaves usually 6 together, setaceous-linear, narrowed at both ends, attenuate towards the base, 1-nerved, $\frac{1}{4}$–$\frac{1}{2}$ in. long, margins revolute, lower leaves spathulate, much broader, $\frac{1}{15}$–$\frac{1}{12}$ in. broad, base quasi-petiolate. Panicles terminal, very divaricately branched, not leafy towards the apex; pedicels very slender, $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowers minute, purple (ex Boissier). Ovary glabrous, smooth.—Cfr. *Galium,* sp. tenuifol., Schweinf. Fl. Soturba, p. 17, n. 170.

Nile Land. Nubia, Soturba, *Schweinfurth !*
Occurs also in the Levant and Persia.

Vaillantia hispida, Linn., a common weed in the Levant, is given by Boissier, Fl. Orient. iii. p. 83, as extending to Nubia. The genus differs from *Rubia* and *Galium* by its ternate flowers, with connate at length thickened and decurved pedicels, the lateral flowers being male only and the middle one hermaphrodite and fertile.

The following genus is of unknown position in the Order.

79. Benzonia, Schum. Beskr. Guin. Pl. 113.

Calyx globose, very small; limb 5-dentate, lobes erect, rather acute. Corolla tubular, coriaceous, glabrous; tube cylindrical; limb 5-cleft, when closed capitellate-

globose, lobes concave, cup-shaped, rather acute. Stamens 5, sessile at the throat, alternate with the corolla-lobes; anthers triquetrous, convex on the back, flat on the sides. Disk depressed, subperforated. Ovary inferior; style filiform, nearly the length of the corolla; stigma ovate-globose, rather acute, longitudinally marked with 6-7 furrows.—Branches woody, terete, papillose-pilose towards the extremities. Leaves opposite, coriaceous; stipules interpetiolar, lanceolate, acute. Peduncles axillary, solitary, dichotomous. Flowers small.

A genus peculiar to this Flora, and quite unknown to me; the description of it as well as of the species, is taken from Schumacher.

1. **B. corymbosa,** *Schum.* l. c. p. 114. Leaves ovate-oblong, acuminate, subcordate at the base, veiny, shining, glabrous, paler and glaucous beneath, the midrib and the younger leaves also above rusty-pilose and ciliate, 3 in. long; petiole $\frac{1}{6}$ in. long, furrowed above, hirsute; stipules membranous, spongy at the base, glabrous. Peduncles about $\frac{1}{2}$ in. long; pedicels bifid, corymbose, hirsute, less than $\frac{1}{12}$ in. long. Calyx hirsute; teeth pilose-ciliate. Corolla-tube $\frac{1}{8}$ in. long. Ovary closely girt by the calyx.

Upper Guinea. Guinea, *fide* Schumacher.

The following genus is also unknown to me; it was referred by its author to the neighbourhood of the shrubby Borragineæ, but it certainly appears to belong to Rubiaceæ, though I am unable to fix its position in the Order.

80. LEPIPOGON, G. Bertol. in Mem. Accad. Bologn. iv. p. 539, t. 21 (1853).

Calyx turbinate, adnate below to the ovary; limb free, 5-cleft. Corolla monopetalous; tube short, inside at the middle furnished with 5 densely bearded scales; limb 5-partite; segments imbricated (in the figure) or perhaps contorted. Stamens 5, included, inserted on the corolla-tube a little above the scales, alternating with the corolla-lobes; filaments very short; anthers oblong-lanceolate, erect, obtuse, subcordate at the base, 2-celled. Epigynous disk flattish, with an annular margin. Style solitary; stigma bifid; branches oblong, thick, obtuse.

1. **L. obovatum,** G. Bertol. *l. c.* A shrub. Stem terete, alternately branched, glabrous except the branchlets which are pubescent at the apex. Leaves obovate, rounded at the apex, quite entire, shortly petiolate, glabrous or sparingly pilose, pubescent on the midrib and lateral veins, $\frac{3}{4}$–$1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{4}{5}$ in.; stipules pubescent, shorter than the leaf; stipules short, broad, ovate, ferruginous-pilose, deciduous. Peduncles terminal, 1-flowered, solitary or in pairs, pubescent, as long as the flowers, $\frac{3}{8}$ in. Calyx pubescent; lobes spathulate (lanceolate in the figure), scarcely acute, narrowed at the base, shorter than the tube. Corolla densely pubescent; tube short; beard white, shining; lobes obovate, obtuse, longer than the tube. Anthers yellowish. Style thicker below.

Mozamb. Distr. Inhambane, *Fornasini.*

There are in the Kew museum specimens of wood and bark, and in the herbarium a leafy shoot without either flower or fruit, of a plant sent by Dr. Kirk from Shupanga and also from the neighbourhood of Senna, which is known in Mozambique by the name of *Mukundukundu;* the trunk is about a foot in diameter, and is used for small canoes; it is very bitter and said to be employed in case of fevers. It appears to belong to Rubiaceæ and may be a species of *Mitragyne*; flowering and fruiting specimens are wanted.

The fifth new genus of Rubiaceæ mentioned by R. Brown in Tuckey's "Congo," p. 448, as intermediate between Rubiaceæ and Apocynaceæ, is *Mostuea,* F. Didr. (1854) i. e. *Leptocladus,* Oliv. (1864), and is now placed in Loganiaceæ.

Order LXXI. VALERIANEÆ. (By W. P. Hiern.)

Flowers hermaphrodite or occasionally unisexual. Calyx-tube adnate to the ovary; limb persistent and membranous or coriaceous or deciduous and resembling feathery pappus, equal or unequal. Corolla gamopetalous, tubular, inserted on an epigynous disk, regular or irregular, sometimes calcarate at the base; lobes 3–5, usually 5, obtuse, imbricated (cochlear) in æstivation. Stamens 1–4, usually 3–4, the posterior one and often one of the lateral ones wanting, inserted on the tube of the corolla, alternating with its lobes; filaments separate, incurved in bud, exserted in flower. Anthers introrse, 2-celled, incumbent, longitudinally dehiscing. Ovary inferior, 3-celled; two cells empty and often smaller than the third fertile one; ovule solitary, pendulous from the apex of the cell, anatropous; style simple, filiform; stigmas 2–3, free or connate. Fruit indehiscent, dry, 1–3-celled, 1-seeded; seed pendulous, exalbuminous; embryo straight, radicle superior, short, cotyledons oblong, rather thick.—Herbs, usually annual. Leaves opposite, entire dentate or pinnatifid, exstipulate, radical ones often rosulate. Flowers bracteate, but little tending to be capitate.

An Order of moderate size, widely scattered and chiefly occurring in temperate climates.

1. VALERIANELLA, Haller; Benth. et Hook. f. Gen. Pl. ii. p. 156.

Calyx-limb persistent, in the flowering stage not involute, often accrescent, dentate or entire, membranous or coriaceous, sometimes obsolete. Corolla funnel-shaped, slender, usually with a short tube and a slight gibbosity at the base; limb subequal, 5-lobed. Stamens 3, inserted about the middle of the corolla-tube. Stigma 3-fid.—Annuals, dichotomously divided. Leaves entire or the upper ones often toothed or incise-pinnatifid. Flowers sessile, solitary, at the apex of the branches crowded in subfastigiate or subglobose bracteate cymes.

A genus of several species, chiefly occurring in cultivated ground, with a wide distribution especially over the temperate regions of the northern hemisphere.

1. **V. dentata,** *Pollich, Hist. Pl.* i. p. 30 (1776) Erect or spreading, subsimple, or dichotomously and divaricately branched, 1½–7 in. high. Leaves spathulate-oblong, obtuse, sessile, quite entire or the uppermost dentate at the base, often somewhat ciliate at the base, otherwise glabrous, ¼–1½ in. long by 1/20–¼ in. wide, the uppermost ones bractiform, linear, smaller. Fruit ovoid, hispid or sometimes at length glabrous; barren cells not contiguous, appearing as linear ribs on the face of the fruit. Calyx-limb obscure, oblique, obtuse, entire (in Tropical African specimens), ovate, elliptical.—DC. Prodr. iv. p. 627.—*V. abyssinica*, Fresen. in Mus. Senckenb. ii. p. 116 (1837); *V. microcarpa*, Lois.; Krok, Monogr. Valerian., i. p. 36, t. i. f. 3 (1864),

&c., which paper may be consulted for further synonyms and information.

Nile Land. Abyssinia, in fields 8,500–9,300 ft. alt. *Schimper! Q. Dillon, Ant. Petit, Rüppell.*

Widely dispersed in cultivated ground over Western and Southern Europe, and the East. Probably the same as the Cape species.

Cf. Boiss. Fl. Orient. iii. pp. 104–5 (1875).

ORDER LXXII. DIPSACEÆ. (By W. P. Hiern.)

Flowers hermaphrodite, irregular or subregular, capitate. Calyx-tube tubular, adnate to the ovary at least at the base or narrowed at the apex into a neck adnate to the base of the style; limb superior, cup-shaped subentire or dentate, sometimes terminating in setaceous lobes. Corolla inserted at the top of the calyx-tube, gamopetalous, tubular, more or less funnel-shaped, 4–5-lobed; lobes usually unequal, imbricated in æstivation; the outer corollas often radiate. Stamens 4, inserted on the corolla, alternating with its lobes; filaments (in Tropical African species) free, incurved in the bud, sometimes didynamous, 2 sometimes without anthers; anthers introrse, 2-celled, deciduous; cells dehiscing longitudinally; pollen smooth, 4-sided. Ovary 1-celled, included within the tube of the calyx; ovule solitary, pendulous, anatropous; style terminal, filiform, simple bidentate or dilated. Fruit 1-seeded, dry, indehiscent, within the tube of the calyx, surrounded by the involucel; seed inverted; testa thinly membranous; albumen scanty, fleshy; embryo straight, in the axis of the albumen, cotyledons subfoliaceous, radicle short, superior. — Annual biennial or perennial herbs or sometimes shrubby; stem and branches nodose-articulated; leaves opposite or very rarely verticillate, simple, entire dentate or pinnate-lobed, sessile and amplexicaul, often connate at the base or petiolate, exstipulate; heads involucrate or naked; each flower enclosed in a calyx-like persistent involucel.

An Order of rather small size found chiefly in the Mediterranean region and at the Cape of Good Hope.

Calyx-limb subcyathiform or discoid.
- Involucral scales longer than the paleæ of the receptacle.
  - Aculeate or setose biennials . . . . . 1. DIPSACUS.
- Involucral scales shorter than the paleæ of the receptacle.
  - Glabrous or hispid perennials . . . . . 2. CEPHALARIA.

Calyx-limb setose or pappose-plumose . . . . . 3. SCABIOSA.

1. DIPSACUS, Tourn.; Benth. et Hook. f. Gen. Pl. ii. p. 158.

Calyx-tube adnate to the ovary, narrowed at the apex; limb cup-shaped. Corolla 4-lobed, funnel-shaped; lobes short, unequal. Stamens 4; filaments free. Ovary inferior. Stigma dilated, obliquely decurved.—Erect stout biennial herbs, setose or spinulose, with angular branches. Leaves opposite, frequently connate at the base, dentate or laciniate. Flowers capitate, inserted on a common receptacle, paleaceous; heads involucrate, terminal, subglobose or pyramidal. Scales

of the involucre several, usually exceeding the paleæ of the receptacle. Involucel 4-sided.

A genus of a few species, occurring chiefly in Europe and Western Asia.

Stem and branches aculeate or sparsely setose above. Involucral bracts several, $\frac{3}{4}$ in. long . . . . . 1. *D. pinnatifidus.*
Stem and branches setose-tomentose above. Involucral bracts few, $\frac{1}{4}$ in. long . . . . . 2. *D. setosus.*

1. **D. pinnatifidus,** *Steud. in Hb. Schimp. Abyss.* sect. ii. n. 665. Erect branched stout herb, 3–5 ft. high; stem hollow, shining, glaucescent, glabrous or as well as the branches aculeate or sparsely setose above and angular. Branches elongate. Leaves oval ovate or lanceolate, acute or acuminate, dentate, scattered with appressed setæ; the upper ones sessile, more or less connate at the base, the lower ones petiolate, ranging up to 6 in. long by 3 in. wide or more. Heads subglobose, 1–1½ in. in diameter; involucral bracts linear-lanceolate, acute, shortly pubescent, setose-ciliate, $\frac{3}{4}$ in. long, deflexed; common receptacle narrowly ellipsoidal, $\frac{1}{2}$ in. long by $\frac{1}{4}$ in. thick; scales lanceolate, acuminate, ciliate above, $\frac{1}{2}$ in. long, equalling or exceeding the flower, tips deflexed or ultimately so. Calyx pubescent, one lobe occasionally produced and linear. Corolla pubescent, much narrowed downwards.—A. Rich. Fl. Abyss. i. p. 367; *D. appendiculatus,* Steud. l.c. ii. n. 865; A. Rich. l.c.; *D. Schimperi,* A. Br. in Schweinf. et Aschers. Enum. p. 287, et in Ind. Sem. Hort. Berol. Append. (1867), fide Vatke in Linnæa xl. p. 199 (1876).

Nile Land. Abyssinia, *Schimper!*

Nearly allied to *D. pilosus,* Linn., from which it differs by the decided deflection of the upper part of the receptacle-scales, at least in full flower. A poor specimen in Hb. Kew from Abyssinia collected by Dr. Roth appears to belong to *D. pilosus.*

2. **D. setosus,** *Hiern.* Erect slightly branched herb, 3½ ft. high; stem glabrous glaucescent and terete below, setose-tomentose and angular above. Leaves ovate or oval or the uppermost ones lanceolate, dentate, glabrous or with patches of setose tomentum beneath; upper acutely acuminate, sessile, connate at the base, the lower ones narrowed at the base into a long petiole, ranging up to 5 in. long by 2 in. wide or more. Heads globose, nearly 1 in. in diameter; involucral bracts few, lanceolate, puberulous, acute, not strongly ciliate, rather more than $\frac{1}{4}$ in. long, spreading; receptacle-scales obovate, terminated by an abrupt shortly ciliate linear-subulate tip, straight, $\frac{3}{8}$ in. long. Calyx pubescent. Corolla much narrowed below into a slender tube, pubescent.

Nile Land. Abyssinia, at Chiré, *Q. Dillon!*

2. **CEPHALARIA,** Schrad.; Benth. et Hook. f. Gen. Pl. ii. p. 159.

Calyx-tube adnate to the ovary; limb cup-shaped or disk-like. Corolla funnel-shaped, 4-fid; lobes somewhat unequal, of moderate length. Stamens 4. Ovary inferior; stigma obliquely dilated.—Erect perennial herbs without prickles or setæ, and often elongated branches. Leaves opposite, entire dentate or pinnatifid. Flowers capitate, in-

serted on a common paleaceous receptacle. Heads involucrate with imbricating scales shorter than the paleæ of the receptacle. Involucel 4-sided.

A genus of several species, occurring chiefly in the Mediterranean region and at the Cape of Good Hope.

Stem elongated, glabrous. Leaves quite entire or with entire or dentate lobes . . . . . 1. *C. centauroides.*
Stem obsolete or very abbreviated. Scape hispidulous above. Leaves crenate . . . . . 2. *C. acaulis.*

1. **C. centauroides,** *Roem. et Schult. Syst. Veg.* iii. p. 49 (1818). Erect perennial, 1–5 ft. high; branches elongate, glabrous at least above, shining, angular. Leaves oblong-lanceolate or linear, usually narrowed to an obtuse apex, simple trifid or pinnatifid, 3–15 in. long, lobes linear spreading, dentate or quite entire, the upper ones sessile, the radical ones petiolate undivided. Heads depresso-globose, $\frac{2}{3}$–1 in. in diameter, few, on long naked glabrous peduncles; scales of the involucre oval, obtuse, pubescent and ciliate; scales of the receptacle longer, less obtuse. Involucel densely hirsute, sulcate inside, crowned with 4 erect linear-oblong teeth. Calyx-limb patelliform, hairy inside, ciliate. Corolla funnel-shaped, villous on both sides. Stamens inserted at about the middle of the corolla.—DC. Prodr. iv. p. 648.

Lower Guinea. Huilla, *Dr. Welwitsch!*

? Mozamb. Distr. Between Mambane and Sotshi, alt. 4500 ft. (a poor specimen), *Dr. Kirk!*

Occurs also in Cape Colony and Natal, and extends to the countries which border on the Black Sea.

Scabiosa decurrens, Thunb. (*C. decurrens,* Roem. et Sch.), mentioned by Major Harris in Highlands of Æthiopia, ii. p. 409 (1844) as a highly ornamental plant with snowy heads, at Shoa, Abyssinia, is probably the same species.

2. **C. acaulis,** *Steud. in Hb. Schimp. Abyss.* sect. ii. n. 563. Root thick, perennial; stem very short or obsolete, 3–6 in. high. Leaves radical or subradical, crowded, oblanceolate or narrowly sublyrate, obtuse, attenuate downwards, quasi-petiolate, dilated and clasping at the base, glabrous or hispid near the base, crenate or incise-lobed, $1\frac{1}{2}$–3 in. long by $\frac{1}{3}$–$\frac{5}{9}$ in. wide. Scape terete, simple, 1-headed, hispidulous above; heads globose, $\frac{3}{4}$ in. in diameter. Scales of the involucre oblong, entire, obtuse with a short apiculus, more or less setose above and on the margin, dark towards the tip. Calyx ciliate. Corolla-tube pubescent outside, somewhat pubescent also inside. Stamens inserted near the top of the corolla-tube.—A. Rich. Fl. Abyss. i. p. 368.

Nile Land. Abyssinia, *Schimper!*

3. **SCABIOSA,** Tourn.; Benth. et Hook. f. Gen. Pl. ii. p. 159.

Calyx-tube adnate to the ovary; lobes setaceous or pappose-plumose. Corolla 4–5-lobed, funnel-shaped, irregular. Stamens 4. Stigma somewhat dilated, emarginate.—Erect or ascending perennial or annual herbs or undershrubs, glabrous or pubescent, with elongated branches. Leaves opposite, entire or pinnatifid. Heads terminal,

pedunculate, depresso-globose, involucrate. Common receptacle paleaceous or hairy. Involucel cylindrical, truncate.

A genus of numerous species growing chiefly in Europe, Central Asia and South Africa.

Calyx-limb setose.
- Corolla 5-lobed. Leaves dentate or pinnate-lobed . . . 1. *S. Columbaria.*
- Corolla 4-lobed. Leaves entire . . . . . 2. *S. succisa.*

Calyx-limb pappose-plumose (Pterocephalus) . . . . . 3. *S. frutescens.*

1. **S. Columbaria,** *Linn.; DC. Prodr.* iv. p. 658. Erect or ascending perennial herb, 1–2½ ft. high; root-stock not premorse; branched especially below; slightly pubescent stem and branches subterete, leafy below. Leaves just connate at the base, the upper ones ovate, generally deeply pinnatifid, 1–3 in. long, acute, lobes narrow, sessile, the lower ones oblanceolate, obtuse or subacute, narrowed at the base into the petiole, dentate or sublyrate, pinnatifid, 2–3 in. long. Heads subhemispherical, ¾–1¼ in. in diameter, on peduncles 4–16 in. long, in a few-headed cyme. Involucral scales uniseriate, about 10, linear, subacute, hairy, ⅓–½ in. long. Scales of the receptacle pubescent, linear, much shorter than the involucral scales. Involucel with a membranous limb. Calyx-lobes setaceous. Corolla 5-lobed, pubescent outside, lobes unequal, in the outer flowers radiant.

Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit!*
Lower Guinea. Huilla, *Welwitsch!*
Widely scattered over Europe and the East.
A poor specimen, collected by T. Baines in the South African Gold-fields, appears to belong to this species.

2. **S. succisa,** *Linn.; DC. Prodr.* iv. p. 660. Erect, herbaceous, perennial, about 1 ft. high; root-stock premorse; stem subterete, more or less pilose with deflexed hairs, leafy at the base. Leaves connate and sheathing at the base, entire or subentire, more or less pilose with ascending hairs, the uppermost ones lanceolate, about 1 in. long, acute, sessile, the lower and radical ones oval or oblong, obtuse or subobtuse, narrowed at the base into the alate clasping petiole, 2–6 in. long by ⅓–1 in. wide. Heads subglobose, ¾ in. in diameter, on peduncles 2–4 in. long or more, with ascending hairs, arranged in a few-headed dichotomous cyme. Involucral scales pluriseriate, linear-lanceolate, pilose, the inner ones shorter and falling short of the flowers. Scales of the receptacle hairy at the top, shorter than the flowers. Involucel thickly pilose, terminated by 4 ovate acute teeth. Calyx-lobes filiform-subulate, barbate. Corolla funnel-shaped, 4-lobed, pubescent outside, glabrous inside. Ovary glabrous except the base.

Upper Guinea. Cameroon Mountains, 10,500 ft. alt., *Mann!*
Widely distributed over the temperate regions of the Old World.

3. **S. frutescens,** *Hiern.* Cæspitose and fruticose at the base, procumbent or ascending, ½–2 ft. high, perennial; branches terete, glabrous or above puberulous or clothed with short white curved hairs. Leaves linear or somewhat lanceolate, acute, narrowed to a sessile or quasi-petiolate base, glabrate or with short white curved

hairs especially on the margins and midrib beneath, entire, $\frac{2}{3}$–$2\frac{1}{2}$ in. long by $\frac{1}{10}$–$\frac{2}{5}$ in. wide. Heads subhemispherical, 1–$1\frac{1}{4}$ in. in diameter, on naked terminal peduncles 2–6 in. long covered with short white curved hairs; scales of the involucre 10–15, subbiseriate, the inner ones alternate and shorter, lanceolate-linear, acute, albido-tomentose on both sides, equalling or somewhat falling short of the flowers. Involucel oblong, tubular, densely pubescent, equalling the ovary, costate, denticulate at the apex. Setæ of the pappus plumose, equalling the corolla-tube; corolla pubescent outside and at the top of the tube inside. Ovary densely pubescent, costate.—*Pterocephalus frutescens*, Hochst. in Hb. Schimp. Abyss. i. n. 235; A. Rich. Fl. Abyss. i. 369; *P. Quartinianus*, A. Rich. l.c.

Nile Land. Abyssinia, *Schimper! Quartin Dillon and Petit! Salt! Pearce!*

ORDER LXXIII. COMPOSITÆ. (By Prof. Oliver and W. P. Hiern.)

Flowers (florets) collected few or many (rarely reduced to one) on a common receptacle, surrounded by an involucre of one or more rows of bracts, forming a capitulum. Receptacle naked or paleaceous or setose, smooth or more or less deeply alveolate. Florets all alike, either ligulate or tubular, or the outer florets (*ray*) ligulate and the inner (*disk*) tubular, or (very rarely in Tropical African genera) bilabiate; ray-florets usually 1-sexual or neuter. Calyx assumed to be adherent throughout to the ovary, limb 0, or represented by a ring of hairs or bristles or scales (*pappus*). Corolla epigynous, tubular, short or long, cylindrical or campanulate, 4–5-toothed with valvate teeth or occasionally very slender with an entire truncate or oblique mouth, or ligulate, the lamina spreading from the centre of the capitulum. Stamens 5 or 4, inserted in the tube of the corolla; filaments free; anthers linear, coherent in a sheath around the style, (rarely contiguous and free) cells often produced at the base into tail-like appendages or sagittate. Ovary inferior, 1-celled, style filiform, usually bifid above, the branches acute, obtuse, truncate or penicillate, flat or terete, sometimes clavate, variously papillose and stigmatic. Ovule solitary erect anatropous. Fruit usually small dry 1-seeded, but rarely winged, naked above or crowned by the persistent sessile or stipitate pappus. Seed exalbuminous.—Herb, shrubs or rarely trees. Leaves alternate or opposite, exstipulate. Capitula terminal, rarely axillary, solitary or variously corymbose or panicled; rarely the heads, few-flowered, are collected in compound capitula.

The largest Natural Order of Phænogamia, represented in every phyto-geographic region, though most numerous, proportionally in the New World, and in the Cape Flora where they exceed 1,300. Of the following 117 genera about 17 are peculiar to this Flora; these are all small or monotypic.

TRIBE I. **Vernoniaceæ.** Capitula homogamous, florets all tubular, hermaphrodite. Involucral scales indefinite, usually multi-

seriate, imbricate. Anther-base obtuse sagittate or more rarely subcaudate. Style-branches slender, more or less elongate and tapering, papillose or minutely hairy externally.—Herbs, shrubs or trees with alternate leaves (except in *Bothriocline*) and purple violet or white flowers.

Capitula separate or axillary, not collected in bracteate cymosely arranged heads.	
Achenes crowned by a cartilaginous cup. Capitula lateral or axillary, sessile. Pappus 0	1. SPARGANOPHORUS.
Achenes truncate with a submarginal little prominent ring or obtuse with an inconspicuous ring. Capitula usually terminal or cymose, rarely lateral.	
Pappus 0.	
Achenes broadly truncate at the apex	2. ETHULIA.
Achenes rounded at the apex	3. GUTENBERGIA.
Pappus composed of a few caducous setæ, not coroniform.	
Setæ of the pappus plumose. Leaves alternate . .	4. ERLANGEA.
Setæ of the pappus scabrous. Leaves usually opposite or verticillate	5. BOTHRIOCLINE.
Pappus partly or wholly composed of numerous usually persistent setæ	6. VERNONIA.
Pappus coroniform, composed of short scales, often with a few longer setæ	7. HERDERIA.
Capitula collected in globose, terminal, bracteate, solitary or cymose heads	8. ELEPHANTOPUS.

TRIBE II. **Eupatoriaceæ.** Capitula homogamous, florets all tubular, hermaphrodite. Involucral scales multi- or sub-2–1-seriate. Anther-base neither sagittate nor caudate. Style-branches elongate, obtuse, usually more or less clavate, glabrous or papillose.—Herbs or shrubs, occasionally scandent with all or the lower leaves opposite except *Eupatorium africanum*. Flowers never distinctly yellow, usually purplish, rose or white.

Apex of anther truncate or minutely apiculate	9. ADENOSTEMMA.
Apex of anther with ovate or lanceolate produced connective.	
Setæ of pappus 4–5, dilated at base	10. AGERATUM.
Setæ of pappus ∞.	
Involucral scales ∞	11. EUPATORIUM.
Involucral scales 4	12. MIKANIA.

TRIBE III. **Asteroideæ.** Capitula heterogamous radiate or discoid, outer florets pistillate, inner hermaphrodite or sterile. Involucral scales ∞, 1–∞-seriate. Corolla of ♀ fl. ligulate or ligule rudimentary or 0 and then tubular and often filiform; of ☿ fl. regular, tubular or dilated above. Anther-base entire obtuse or bidentate (rarely sagittate), apex with a produced connective. Style-branches flattened more or less with stigmatic margins, apical appendix lanceolate to deltoid, papillose. Achenes with setaceous pappus, or pappus rudimentary or 0.—Herbs or shrubs. Leaves alternate.

1 § *Grangeineæ*. ♀ fl. 1–∞-seriate, not exceeding those of the disk, tubular dentate or with rudimentary ligule or campanulate. Pappus 0 or rudimentary, or of few very caducous setæ.

Setæ of pappus few, short, minutely glochidiate very caducous setæ. Receptacle naked convex . . . . 13. MICROTRICHIA.
Pappus 0. Receptacle naked, turbinate or columnar. Capitula white and purple or violet . . . . . 14. DICHROCEPHALA.
Pappus of minute subpaleaceous teeth. Receptacle naked, convex or conical. Capitula yellow . . . . . 15. GRANGEA.
Pappus reduced to papillose annulus. Receptacle flat, paleaceous. Capitula yellow . . . . . 16. CERUANA.

2 § *Bellideæ*. ♀ fl. 1-seriate, ligulate, ligule spreading or recurved, white. Pappus 0 . . . . . 17. BRACHYCOME.

3 § *Heterochromeæ*. ♀ fl. 1–∞-seriate, all or outer distinctly ligulate, ray white, purple or blue. Pappus setaceous, 1–2-seriate.

Ligule oval or oblong . . . . . 18. FELICIA.
Ligule narrow or filiform . . . . . 19. ERIGERON.

4 § *Conyzeæ*. Capitula disciform, ♀ fl. tubular filiform, ligule 0 or inconspicuous. Pappus setaceous. Capitula yellow more or less or rudimentary, ligule white.

Style of ☿ fl. distinctly 2-fid.
Achenes costate, scarcely compressed. Ligule present, white. Shrubs . . . . . 20. MICROGLOSSA.
Achenes compressed. Ligule present yellow. Herbs . 21. NIDORELLA.
Achenes compressed. Ligule 0 or minute. Capitula yellowish. Herbs or frutescent . . . . . 22. CONYZA.
Achenes scarcely compressed, costate. Ligule present, yellow. Shrubs . . . . . 23. PSIADIA.
Style of ☿ fl. entire or emarginate. Ligule 0. Achenes terete. Erect annuals . . . . . 24. ADELOSTIGMA.

TRIBE IV. **Inuloideæ.** Capitula heterogamous, radiate or usually discoid with outer florets pistillate and inner hermaphrodite or sterile, or homogamous with all the florets hermaphrodite and tubular, or rarely dicœcious. Involucral scales usually in many rows, rarely sub-2-seriate. Corolla of ♀ fl. ligulate or filiform, of ☿ fl. regular, tubular, shortly lobed. Anther-base sagittate, usually tailed; connective produced at the apex. Style-branches of the ☿ fl. narrow, more or less flattened above, rounded or truncate, not appendaged at the apex. Achenes various. Pappus usually setaceous or wanting.—Herbs, shrubs, or small trees. Leaves alternate, undivided or rarely lobed.

Dicœcious. Involucral scales sub-2-seriate, coriaceous
Hermaphrodite. Involucral scales pluri- or pauci-seriate or rarely few, scarious or herbaceous.
Female florets, when present, filiform or narrowly tubular, not ligulate.
Style-branches of the hermaphrodite florets filiform, not truncate.
Receptacle naked . . . . . Subtribe ii. PLUCHEINÆ.
Receptacle, at least about the circumference, paleaceous . . . . . Subtribe iii. FILAGINÆ.
Style-branches of the hermaphrodite florets truncate . . . . . Subtribe iv. GNAPHALIINÆ.
Female florets, when present, ligulate or rarely tubular.
Receptacle naked.
Style-branches of the hermaphrodite florets truncate . . . . . Subtribe v. ATHROISMINÆ.

Subtribe i. TARCHONANTHEÆ.

Style-branches of the hermaphrodite florets wider and rounded at the apex . . . . Subtribe vi. EUINULEÆ.
Receptacle rigidly paleaceous . . . . . Subtribe vii. BUPHTHALMEÆ.

Subtribe i. TARCHONANTHEÆ . . . . . 25. TARCHONANTHUS.

Subtribe ii. PLUCHEINEÆ.

Capitula separate, not crowded in compound heads.
Setæ of the pappus slender, copious.
Herbs. Involucral scales narrow.
Anther-base tailed . . . . . 26. BLUMEA.
Anther-base not tailed . . . . . 27. LAGGERA.
Shrubs or undershrubs. Involucral scales usually rather broad . . . . . 28. PLUCHEA.
Setæ of the pappus few or paleaceous or absent.
Pappus of the hermaphrodite florets composed of 1 or 2 setæ . . . . . 29. DENEKIA.
Pappus altogether wanting . . . . . 30. EPALTES.
Capitula crowded in globose or oblong or ovoid compound heads . . . . . 31. SPHÆRANTHUS.

Subtribe iii. FILAGINEÆ.

Nearly glabrous shrubs. Achenes of the female florets winged . . . . . 32. BLEPHARISPERMUM.
Cottony herbs. Achenes of the female florets subterete, not winged . . . . . 33. FILAGO.

Subtribe iv. GNAPHALIEÆ.

Female florets more numerous than the hermaphrodite florets.
Achenes of the female florets or of all the florets without pappus . . . . . 34. CHILIOCEPHALUM.
Achenes of the florets provided with pappus.
Anther-base obtuse or minutely tailed . . . . . 35. PHAGNALON.
Anther-base tailed.
Capitula 4–9-flowered, narrow . . . . . 36. ACHYROCLINE.
Capitula many-flowered, broader . . . . . 37. GNAPHALIUM.
Female florets less numerous than the hermaphrodite florets 38. HELICHRYSUM.

Subtribe v. ATHRIXIEÆ.

Pappus consisting of short paleæ connate at the base and of a few long outer plumose setæ . . . . . 39. LEYSSERA.
Pappus consisting of scabrous or plumose setæ in one row, or with shorter ones in an outer row. Involucral scales usually squarrose . . . . . 40. ATHRIXIA.
Pappus consisting of copious slender setæ in about two rows. Involucral scales appressed . . . . . 41. ANTITHRIXIA.

Subtribe vi. EUINULEÆ.

Pappus setaceous, 1–2-seriate, without a short outer row . 42. INULA.
Outer pappus composed of short setæ or paleaceous, or wanting in *Vicoa*.
Capitula homogamous.
Outer pappus short, not paleaceous . . . . . 43. IPHIONA.
Outer pappus short, paleaceous, lacero-dentate . . . 44. PEGOLETTIA.
Capitula heterogamous.
Outer pappus wanting . . . . . 45. VICOA.
Outer pappus not short, paleaceous; paleæ entire . . 46. CALOSTEPHANE.
Outer pappus very short, usually paleaceous; paleæ forming a little cup . . . . . 47. PULICARIA.
Outer pappus very short, paleaceous; paleæ separate . 48. PORPHYROSTEMMA.

Subtribe vii. BUPHTHALMEÆ.

Involucre at length subglobose, hard . . . . . 49. GEIGERIA.
Involucre wide; scales broadly scarious-appendaged . . . 50. ONDETIA.
Involucre hemispherical; scales pauci-seriate, the outer ones usually herbaceous.
  Pappus coroniform, consisting of short unequal paleæ and a few longer aristæ . . . . . 51. ANISOPAPPUS.
  Pappus consisting of paleæ as long as the ovary . . . 52. ODONTOSPERMUM.

TRIBE V. **Helianthoideæ.** Capitula heterogamous, radiate or rarely discoid, ray-florets ♀ fertile or neuter, disk-florets ☿ fertile or sterile; or capitula homogamous discoid unisexual or with all the florets ☿. Involucral bracts various. Receptacle paleaceous or rarely on the disk, under the sterile florets, naked. Corolla of the hermaphrodite florets tubular, regular, 4–5-cleft. Anthers appendaged at the apex, at the base entire obtuse or scarcely tailed. Style-branches of the ☿ florets truncate or appendaged. Achenes various, usually compressed or angular; pappus aristate or shortly paleaceous or wanting.—Leaves, at least the lower ones, usually opposite. Flowers usually yellow.

Capitula unisexual. Anthers scarcely cohering. Leaves alternate or mostly so . . . . . Subtribe i. *Ambrosieæ*
Capitula bisexual. Anthers cohering. Leaves mostly opposite.
  Paleæ of the receptacle usually folded or convex. Achenes of the disk angular subterete or laterally compressed . . . . . Subtribe ii. *Verbesineæ*.
  Paleæ of the receptacle flat or nearly so. Achenes of the disk more or less dorsally compressed . . . Subtribe iii. *Coreopsideæ*.

Subtribe i. AMBROSIEÆ.

Involucre of the male capitula gamophyllous. Female capitula 1-flowered . . . . . 53. AMBROSIA.
Involucre of the male capitula with free bracts. Female capitula 2-flowered . . . . . 54. XANTHIUM.

Subtribe ii. VERBESINEÆ.

Inner involucral bracts (or outer paleæ of the receptacle) embracing the fertile ray-achenes.
  Ray-florets in one row. (Outer) involucral bracts 5, narrow 55. SIGESBECKIA.
  Ray-florets in many rows. (Outer) involucral bracts 4, broad . . . . . 56. ENHYDRA.
Inner involucral bracts flat.
  Paleæ of the receptacle very narrow, usually few . . . 57. ECLIPTA.
  Paleæ of the receptacle broader, numerous.
    Leaves mostly alternate . . . . . 58. SCLEROCARPUS.
    Leaves opposite.
      Pappus forming a small cup or annulus, with or without 2–3 aristæ.
        Ray-florets fertile.
          Ligule small. Aristæ of the pappus 2 or 3, persistent . . . . . 59. BLAINVILLEA
          Ligule conspicuous. Aristæ or short setæ of the pappus caducous . . . . . 60. WEDELIA.
        Ray-florets neuter. Ligule conspicuous . . . . 61. ASPILIA.
      Pappus consisting of distinct aristæ, rarely reduced to teeth, not forming a cup or annulus.

Achenes thick. Pappus very caducous . . . . 62. MELANTHERA.
Achenes (of the disk) compressed. Pappus 0 or of 2–3 aristæ or setæ.
Capitula loosely cymose. Achenes winged . . 63. XIMENESIA.
Capitula solitary. Achenes not winged . . . 64. SPILANTHES.

Subtribe iii. COREOPSIDEÆ.

Involucral bracts free; the outer ones herbaceous, the inner ones like the paleæ of the receptacle.
Achenes subtetragonal, without pappus . . . . . 65. GUIZOTIA.
Achenes nearly flat, winged, 2–3-aristate . . . . . 66. SYNEDRELLA.
Inner involucral bracts connate at the base, outer few, smaller.
Style-branches truncate, usually shortly appendaged.
Achenes without aristæ . . . . . 67. MICROLECANE.
Achenes furnished with 2–4 aristæ.
Aristæ with ascending setulæ (or smooth) . . . . 68. COREOPSIS.
Aristæ with descending setulæ . . . . . 69. BIDENS.
Style-branches tapering in long puberulous appendages . 70. CHRYSANTHELLUM.

TRIBE VI. **Helenioideæ.** Capitula homogamous and discoid or heterogamous with the ray-florets female and disk-florets hermaphrodite. Involucral bracts in 1 or few rows. Receptacle naked. Corolla of the disk-florets tubular, regular, shortly 5-cleft. Anthers appendaged at the apex; base obtuse, not caudate. Style-branches obtuse or truncate. Achenes narrowly oblong. Pappus consisting of aristiform paleæ.—Herbs (or undershrubs) with opposite entire or lobed leaves and yellow flowers.

Involucral bracts in 4–5 rows. Achenes 4–5-angled. Heads discoid. Leaves entire . . . . . 71. JAUMEA.
Involucral bracts in 1 row. Achenes striate. Heads radiate. Leaves cut . . . . . 72. * TAGETES.

TRIBE VII. **Anthemideæ.** Capitula heterogamous, radiate or discoid. Involucral bracts pauci- or multi-seriate, imbricated. Receptacle naked or furnished with paleæ subtending the florets. Outer florets female, ligulate or tubular; inner florets hermaphrodite, tubular; corollas 4–5-lobed. Anthers not tailed, obtuse at the base. Style-branches usually truncate. Achenes rather small. Pappus 0 or obliquely coroniform or consisting of short teeth.—Herbs or undershrubs, with alternate or rarely opposite pinnatisect or toothed leaves, yellow disk-florets and white or yellow ligules.

Receptacle furnished with paleæ . . . . . 73. ANTHEMIS.
Receptacle naked or fimbrilliferous.
Heads radiate . . . . . 74. MATRICARIA.
Heads discoid.
Heads solitary. ☿ corollas 4-toothed . . . . . 75. COTULA.
Heads in corymbose or hemispherical cymes. ☿ corollas 4-toothed . . . . . 76. SCHISTOSTEPHIUM.
Heads in thyrsoid racemes. ☿ corollas 5-toothed . 77. ARTEMISIA.

TRIBE VIII. **Senecionideæ.** Capitula heterogamous radiate or rarely discoid, or homogamous. Involucral bracts in 1–2 rows or rarely in many graduated rows, occasionally connate at the base or

higher, the outer row sometimes calyculate. Receptacle naked or foveolate or fimbrillate. Corolla of the disk-florets tubular, regular, shortly 4–5-cleft. Anthers appendaged at the apex, usually sagittate but not tailed at the base. Style-branches of the hermaphrodite florets usually penicillate, truncate or appendaged, rarely tapering into long puberulous extremities. Pappus setose or rarely wanting.—Herbs shrubs or trees with alternate leaves and disk-florets usually yellow.

Involucral bracts in many rows, the outer ones successively shorter (Subtribe *Liabeæ*) . . . . . 78. GONGROTHAMNUS.
Involucral bracts in 1–2 rows, subequal, sometimes with an outer calyculate row.
Involucral bracts free or soon becoming so (Subtribe *Eusenecioneæ*).
Style-branches ending in long subulate puberulous extremities . . . . . 79. GYNURA.
Style-branches truncate or shortly penicillate.
Achenes, at least those of the ray-florets, dorsally compressed, usually broad . . . . . 80. CINERARIA.
Achenes 5–10-ribbed or 5-angled, not dorsally compressed or not much so.
Involucre not calyculate. Capitula discoid.
Style-branches with an appendix. . . . . 81. EMILIA.
Style-branches ending in a continuous ovate or lanceolate papillose extremity . . . 82. NOTONIA.
Involucre calyculate or capitula radiate (except *S. emilioides*) . . . . . 83. SENECIO.
Involucral bracts connate into a cup at the base or higher (Subtribe *Othonneæ*).
Florets of the disk all or mostly fertile; style bifid.
Low tufted acaulescent herb . . . . . 84. WERNERIA.
Procumbent branched undershrub . . . . . 85. EURYOPS.
Florets of the disk sterile; style undivided . . . 86. OTHONNA.

TRIBE IX. **Calenduleæ.** Capitula heterogamous, radiate; florets of the ray female, fertile, in 1–2 rows; florets of the disk hermaphrodite, barren. Involucral bracts narrow, in 1–2 rows, herbaceous or membranous, usually scarious on the margins. Receptacle naked. Corollas of the ray-florets ligulate, entire or 3-dentate at the tip; corollas of the disk-florets regular, tubular, shortly 5-cleft. Anthers sagittate with mucronate auricles or subentire and obtuse. Style of the hermaphrodite florets undivided and rounded at the apex or with 2 short flattened truncate branches; style of the female florets bidentate or undivided. Achenes of the ray-florets large, winged or subterete; those of the disk effete. Pappus 0.—Herbs or shrubs with alternate or occasionally opposite leaves and yellow or purple flowers.

Achenes 3-winged . . . . . 87. TRIPTERIS.
Achenes subterete, not winged . . . . . 88. OSTEOSPERMUM.

TRIBE X. **Arctotideæ.** Capitula heterogamous radiate or rarely homogamous by deficiency of the ray-florets; ray-florets female or neuter; disk-florets hermaphrodite, fertile or the innermost ones sterile. Involucral bracts in many rows, imbricated, broadly scarious or very acute or spinous at the apex. Corollas of the ray ligulate; corollas of the disk tubular, regular. Anther-base entire or sagittate;

auricles obtuse or acute or mucronate, not tailed. Style of the disk-florets obtuse, short. Achenes usually thick; pappus paleaceous or coroniform or wanting.—Herbaceous or somewhat shrubby, with alternate or radical leaves, yellow or purple disk-florets, and yellow purple or white rays.

Capitula separate, not collected into heads, radiate.
Involucral bracts free, the inner ones at least broadly scarious.
Ray-florets neuter. Receptacle paleaceous . . . . 89. URSINIA.
Ray-florets female. Receptacle alveolate, naked or fimbrillate.
Achenes not winged.
Achenes glabrous. Pappus minute or short . . 90. LANDTIA.
Achenes with a basal tuft of silky hairs. Pappus paleaceous, conspicuous . . . . . 91. HAPLOCARPHA.
Achenes with lateral curved wings enclosing dorsal cavities . . . . . 92. ARCTOTIS.
Involucral bracts connate at the base or higher, acute or spinous.
Receptacle shortly alveolate. Involucral bracts connate two-thirds way up. Leaves not bristle-pointed . . . . . 93. GAZANIA.
Receptacle deeply alveolate. Involucral bracts connate only at the base. Leaves bristle-pointed . . . . . 94. BERKHEYA.
Capitula collected in a dense head, discoid . . . . . 95. PLATYCARPHA.

TRIBE XI. **Cynaroideæ.** Capitula homogamous or rarely heterogamous with larger neuter ray-florets in one row. Involucral bracts in many rows, imbricated, usually terminating in a spine or scarious appendix. Receptacle setose. Corollas all 5-cleft or -partite. Anther-base sagittate; auricles connate, mucronate or with fimbriate tails. Styles (of the hermaphrodite florets) with short, narrow, rather obtuse branches, usually with a ring of hairs below the fork. Achenes usually hard setose or narrowly paleaceous in several rows or 0.—Herbs often spinous with alternate or radical leaves and red yellow or white flowers, occasionally dicœcious.

Capitula 1-flowered, collected into heads . . . . . 96. ECHINOPS.
Capitula many-flowered, separate.
Achenes with a nearly central horizontal callus at the base. Setæ of the pappus connate into a ring at the base.
Setæ of the pappus barbellate . . . . . 97. CARDUUS.
Setæ of the pappus plumose . . . . . 98. CNICUS.
Achenes with an oblique or lateral callus at the base. Setæ or paleæ of the pappus not connate at the base or 0.
Involucre naked at the base. . . . . 99. CENTAUREA.
Involucre girt at the base with floral leaves . . . 100. CARTHAMUS.

TRIBE XII. **Mutisiaceæ.** Capitula homogamous with all the florets tubular and hermaphrodite, or with the outer florets bilabiate, or heterogamous radiate with the ray-florets female or neuter, sometimes bilabiate. Involucral bracts in many or few rows, imbricated. Re-

ceptacle naked or rarely paleaceous, smooth or alveolate or fimbrillate. Corollas of the disk-florets either tubular and pentamerous or bilabiate; corollas of the ray-florets ligulate with or without a shorter bilobed inner lip. Anther-base with long tails. Style-branches obtuse rounded or truncate at the apex, not appendaged. Achenes crowned with a setaceous or paleaceous pappus.—Herbs or rarely shrubs with alternate or radical leaves and usually purple or scarlet flowers.

Caulescent branched herbs or shrubs.
  Involucral bracts obtuse or lanceolate or subulate, not pungent.
    Florets all hermaphrodite tubular. Involucral bracts very obtuse . . . . . 101. PLEIOTAXIS.
    Heads homogamous, radiate, with all the florets hermaphrodite. Involucral bracts ovate or lanceolate . . . . . 102. ERYTHROCEPHALUM.
    Heads heterogamous, radiate. Involucral bracts subulate-prolonged . . . . . 103. PHYLLACTINIA.
  Involucral bracts rigid, straight, pungent.
    Pappus pluriseriate . . . . . 104. DICOMA.
    Pappus uniseriate . . . . . 105. HOCHSTETTERIA.
Acaulescent, scapigerous herbs . . . . . 106. GERBERA.

TRIBE XIII. **Cichoriaceæ.** Capitula homogamous; florets all hermaphrodite, ligulate, fertile or occasionally a few barren. Corolla-tube slender; ligule 5-toothed. Anthers appendaged at the apex, sagittate at the base, auricles acute or setaceous-acuminate, not tailed. Style-branches slender, rather obtuse or rather acute.—Herbs with usually milky sap, alternate or radical leaves, and yellow or occasionally purple or blue flowers.

Pappus paleaceous, or with not more than 12 setæ, or coroniform, or altogether wanting.
  Corona of the pappus short; setæ 2-3 or 0. Flowers yellow. Receptacle paleaceous . . . . . 107. SCOLYMUS.
  Paleæ of the pappus short or wanting. Flowers blue. Receptacle naked or sparingly fimbrillate . . . 108. CICHORIUM.
  Setæ of the pappus 12, in one row. Flowers yellow. Receptacle alveolate . . . . . 109. TOLPIS.
Pappus setaceous, copious.
  Setæ of the pappus plumose . . . . . 110. PICRIS.
  Setæ of the pappus simple, smooth or barbellate, not plumose.
    Achenes more or less beaked.
      Achenes subterete or obscurely angular, not compressed . . . . . 111. CREPIS.
      Achenes, at least the outer ones, more or less compressed.
        Achenes all similar . . . . . 112. LACTUCA.
        Outer achenes compressed, the inner ones columnar . . . . . 113. HETERACHÆNA.
    Achenes not beaked.
      Outer involucral bracts, with conspicuous scarious margins. Achenes oblong . . . . . 114. REICHARDIA.
      Outer involucral bracts herbaceous or achenes narrow.
        Achenes 10—∞-costate or -striate.

Subacaulescent. Capitula solitary, sessile or shortly pedunculate . . . . . 115. DIANTHOSERIS.
Caulescent. Capitula pedicellate, cymose . 116. SONCHUS.
Achenes 4–5-costate . . . . . 117. LAUNÆA.

1. SPARGANOPHORUS, Vaill.; Benth. et Hook. f. Gen. Pl. ii. 223.

Capitula homogamous many-flowered. Involucre hemispherical; bracts ∞-seriate, imbricate, the outer smaller; receptacle plain or slightly convex, naked. Corolla 3–4-fid, segments acute. Anther-base sagittate acuminate ecaudate. Style-branches subulate. Achenes 3–4-angled crowned by a cartilaginous obscurely toothed appendix, epappose.—Annual herb. Leaves alternate simple.

Monotypic.
Occurs also in Tropical America.

1. **S. Vaillantii,** *Gaertn.*; *DC. Prodr.* v. 12. Erect or decumbent, 1½–2 ft., glabrous or extremities and unfolding leaves often thinly hirsute or pubescent. Leaves membranous, from elongate-linear-lanceolate to elliptical narrowed to each end, repand- or obscurely dentate to more coarsely serrate-dentate, with petiole usually from 3–7 in. long. Capitula closely congested in the axils, sometimes solitary, sessile, ¼–⅓ in. diam.—*S. africanus*, Steud. DC. l. c.; *Struchium africanum*, Beauv. Fl. Owar. i. 81, t. 48.

Upper Guinea. Widely spread, *various collectors.*
Nile Land. Niamniam-land, *Dr. Schweinfurth!*
Lower Guinea. Congo, *C. Smith!*

2. ETHULIA, L.; Benth. et Hook. f. Gen. Pl. ii. 224.

Capitula homogamous many-flowered. Involucre hemispherical or campanulate; bracts numerous imbricate. Receptacle convex naked. Corolla narrowed below, limb campanulate, 5-fid. Anther linear, base obtuse, apical appendix ovate or lanceolate. Style-branches subulate hairy. Achene 5–4-costate, ribs prominent, truncate above, epappose.—Branching herbs. Leaves alternate simple. Capitula small in corymbose cymes, purplish.

Includes two species of the Old World tropics.

1. **E. conyzoides,** *L.*; *DC. Prodr.* v. 12. Erect, more or less branched, 2–3 ft. or higher. Stem thinly appressed hirsute or glabrescent, extremities sulcate. Leaves linear-lanceolate to narrowly elliptical or linear narrowed to each end, subdistantly sometimes obscurely serrate or entire, puberulous or thinly appressed hirsute-tomentose especially beneath or nearly glabrous, more or less glandular-dotted beneath, 1–5 in. long, with petiole ¼–1½ in. broad. Capitula ⅛–¼ in. broad in subdense or diffuse corymbose cymes or cymes of fewer heads at the extremities of the upper branches and loosely panicled; pedicels ½–½ in.—*E. gracilis*, Del. Voy. à Méroé, 44, t. 3, fig. 5 (form with more paniculate cymes and subentire leaves); *E.*

angustifolia, Boj. ex DC. Prod. l. c.; *E. Kraussii*, Sch. Bip., Walp. Rep. ii. 945.

Widely spread in Tropical as well as in Extratropical Africa and India.

3. GUTENBERGIA, Schultz Bip.; Benth. et Hook. f. Gen. Pl. ii. 224.

Capitula homogamous many-flowered. Involucre campanulate; bracts multi- or pauci-seriate, imbricate, outer smaller; receptacle naked. Corolla regular, narrowed below, limb 5-fid. Anthers linear, base obtuse, apical appendix lanceolate acute. Achenes oblong or ellipsoidal, 10–8-costate, ribs equal or alternately narrower, or 4-5-costate; apex obtuse, epappose.—Branched herbs. Leaves alternate or the lower subopposite, simple. Capitula small or medium-size, in lax or sparse paniculate or corymbose cymes.

Confined to Africa.

Achenes 8–12-costate.

Ribs alternately narrower. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. in diffuse cymes.

Inner involucral scales obtuse . . . . . 1. *G. Rüppellii.*

All the involucral scales acute . . . . . 2. *G. Petersii.*

Ribs equal or nearly so.

Involucral scales multiseriate.

Capitula $\frac{1}{2}$ in. Involucral scales lanceolate . . . 3. *G. nigritana.*

Capitula $\frac{3}{4}$–1 in. Outer involucral scales broad obovate, inner linear-spathulate acuminate . 4. *G.? macrocephala.*

Involucral scales pauciseriate. Capitula numerous, $\frac{1}{4}$ in. . . . . 5. *G. polycephala.*

Achenes 4–5-costate. Capitula $\frac{1}{2}$ in., solitary at extremities . . . . . 6. *G. longipes.*

Achenes obovoid 5-costate, each rib longitudinally grooved; intercostal spaces transversely ridged. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. loosely panicled . . . . . 7. *G. cordifolia.*

1. **G. Rüppellii,** *Sch. Bip.; Walp. Rep.* ii. 703. Erect annual or biennial thinly hoary-tomentose herb, $\frac{1}{2}$–2 ft., branched from the upper axils. Leaves alternate or the lower opposite or subopposite linear-lanceolate to linear-oblanceolate, lamina narrowed to the insertion, acute or broadly pointed, entire or obscurely denticulate, glabrescent above appressed hoary-tomentose beneath, 1–$2\frac{1}{2}$ in. long. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. diam. in peduncles of $\frac{1}{2}$ in. or less in diffuse terminal corymbose cymes or laxly panicled; involucral scales lanceolate, the outer acute, more or less cottony, inner usually purplish above, scarious-margined. —*Ethulia Rüppellii*, Hochst.; A. Rich. Fl. Abyss. i. 372. *G. abyssinica*, Sch. Bip.; Walp. Ann. ii. 808.

Nile Land. Abyssinia, *Schimper! Petit!* Upper Nile (*Schweinf. Enum.*).

2. **G. Petersii,** *Steetz in Peters Mossamb. Bot.* p. 348. Erect, 1–$1\frac{1}{2}$ ft. high, apparently annual, thinly cottony above, glabrate below. Leaves linear-lanceolate, acute or apiculate, subentire or with a few minute teeth, green and subglabrous above, hoary and obsoletely tomentose beneath, ranging up to 2–$2\frac{1}{2}$ in. long, the upper ones cordate-

amplexicaul, the lower ones narrowing to a sessile base. Capitula $\frac{1}{4}$ in. diam., on slender pedicels ranging up to $\frac{2}{3}$ in., in a diffuse corymbose cyme. Involucral scales lanceolate acutely acuminate, thinly cottony; the outer ones narrower and shorter. Achenes 8–10-ribbed.

Mozamb. Distr. At Tette, *Peters!*

3. **G. nigritana,** *O. & H.* Erect branching herb of probably 2–3 ft.; branches crisped-puberulous or thinly hirsute above, striate. Leaves oval-oblong, acute or broadly pointed, more or less obtuse at base, subsessile or very shortly petiolate, remotely denticulate, sparsely hairy often scabrid at length glabrate above, pubescent or subtomentose beneath, varying up to 3–4 in. long. Capitula ∞-flowered purple nearly $\frac{1}{2}$ in. diam. on peduncles varying to 2 in. the central often subsessile, in irregular ascending dichotomous paniculate cymes; involucral scales ascending subappressed, outer and median lanceolate very acute rigid, inner nearly equalling the florets more broadly pointed or obtuse, glabrate or cottony. Achenes columnar equally or subequally and strongly 10-costate.—*Oiospermum nigritanum*, Benth. Fl. Nigrit. 425.

Upper Guinea. Niger-land, *Th. Vogel! Barter!* Abbeokuta, *Irving!*

Var. *scabra.* Leaves scabrid, hirsute-tomentose beneath, heads cottony, Yomba, Niger, *Barter!*

4. **G.? macrocephala,** *O. & H.* Erect herb of probably 2–4 ft., with terete striate thinly pubescent ascending branches. Leaves alternate ovate- or lanceolate-oblong acute subentire rugulose-scabrous above, reticulate and pubescent beneath, varying to 4–5 in. long by 1 in. or more broad; petioles (of upper leaves) very short. Capitula many-flowered hemispherical, $\frac{3}{4}$–1 in. diam. singly terminating numerous long erect striate pubescent peduncles, forming a lax cymose panicle; scales of involucre multi-seriate scarious loosely appressed denticulate nearly glabrous; outer obovate broadly rounded and mucronate above, inner linear-spathulate and sharply acuminate above. Receptacle naked. Achenes columnar terete slightly curved strongly 10-costate glabrous, callus-based.

Upper Guinea. Abbeokuta, *Irving!*

5. **G. polycephala,** *O. & H. in Journ. Linn. Soc. Lond.* xv. 95 (1876). Erect branching more or less hoary-tomentose herb; stem terete striate thinly tomentose. Upper leaves sessile, lanceolate or ovate-lanceolate, 1–2 in. long, from an obtuse or cordate-amplexicaul base, entire or subentire, glabrescent or scaberulous above, whitish-tomentose beneath. Capitula small in diffuse cymose panicles, on slender peduncles varying to $\frac{1}{2}$–$\frac{3}{4}$ in. Involucral scales appressed, pauciseriate, outer shorter linear-lanceolate, inner oval-oblong 3-nerved, acute or at length weathered and obtuse. Achenes obovoid, longitudinally and subequally 10–12-costate, glabrous or with thinly scattered short hairs.

South Central. With specimens from region of Lake Tanganyika, *Cameron!*
Mozamb. Distr. Kilwa and Monfia, *Dr. Kirk!*

6. **G. longipes,** *Sleetz in Peters Mossamb. Bot.* 349. Tall erect

herb branched above, stem finely sulcate, crispate-hirsute. Leaves membranous or subcoriaceous, lanceolate, upper cordate-based ½-amplexicaul, subacute, mucronulate, remotely denticulate, thinly hairy, paler or glaucous glabrate except on midrib beneath. Capitula ∞-flowered ½ in. long and broad, solitary at the extremities on peduncles of 2–4 in.; involucral scales subappressed linear-lanceolate acuminate-aristate glabrous or thinly pilose, shining. Achenes 1 line long equally 4–5-costate.

Mozamb. Distr. Inhambane and Caboçeira peninsula, *Peters!*

7. **G. cordifolia,** *Benth. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. 89, t. 55. Erect branching herb; stem terete striate appressed silky-pubescent. Upper leaves ovate, sessile or subsessile from a more or less cordate amplexicaul base, acute or broadly pointed, serrulate or obscurely denticulate, scabrid above appressedly hoary-tomentose beneath, 1–3 in. long; radical leaves not seen. Capitula campanulate, purple, ¼–⅓ in. diam., on hoary peduncles varying to ½ in. in lax cymose panicles. Scales of involucre appressed thinly tomentose, outershorter linear-lanceolate, inner elliptic-oblong, obscurely 3-nerved, scarious-margined, rather obtuse, purplish above. Corolla gradually narrowed. Anther-base apparently obtuse. Achenes obovoid glabrous with a narrow areolus, obtusely 5-costate, each ridge longitudinally grooved, transversely rugose between the ridges.

Nile Land. Unyoro (*Vernonia*, No. 9 App. Speke's Journ. 637), *Speke and Grant!* White Nile, *Schweinfurth!*

4. **ERLANGEA,** Sch. Bip.; Benth. et Hook. f. Gen. Pl. ii. 225.

Capitula homogamous ∞-flowered. Involucre hemispherical, scales 2–3-seriate; receptacle naked. Corolla purple, tubular, 5-toothed, teeth linear. Anthers shortly pointed at base. Achenes subturbinate, 4–(5-) angled, truncate; pappus 1-seriate, of about 5 shortly plumose caducous setæ.—Slender elongate leafy herb. Leaves alternate linear. Capitula pedicellate in few-headed terminal cymes.

Based upon the following species, which is confined to West Tropical Africa.

1. **E. plumosa,** *Sch. Bip. in Flora*, 1853, p. 34. Slender erect simple herb, 1–1½ feet high; stem terete, striate, softly pubescent, leafy. Leaves alternate, linear, remotely denticulate, hairy, sessile, ½–1 in. long. Capitula subglobose, ¼ in. diameter, on slender pedicels 1–2 in. long, in a lax few-headed terminal cyme. Scales of involucre pubescent, acute, inner linear, outer lanceolate. Achenes setulose especially on the angles, and with a few sessile glands on the faces.—*Jardinia plumosa*, Sch. Bip.; Jardin in Nouv. Ann. Marin. et Colon. 1850–51, p. 19.

Upper Guinea. Gaboon, *Jardin!*

5. **BOTHRIOCLINE,** Oliv.; Benth. et Hook. f. Gen. Pl. ii. 226.

Capitula homogamous, many-flowered. Involucre subhemispherical or broadly campanulate; bracts pauci- or pluri-seriate, outer rather smaller, broadly scarious-margined; receptacle more or less foveolate, convex or plane. Corolla narrowed below, limb acutely 5-fid. Anthers

linear, base obtuse, apical connective subulate or lanceolate. Style-branches exserted slender tapering, thinly hispid. Achenes obovoid or ellipsoidal with about 6 prominent rounded ridges, somewhat rounded above; hairs of pappus stiff hispid-scabrous very caducous.—Herb with opposite or verticillate penniveined leaves and terminal corymbose cymes of moderate-sized capitula.

Based upon the following species.

1. **B. Schimperi,** *O. & H.; Benth. in Hook. Ic. Pl.* 1133. Erect herb; stem stout, smooth, early glabrous below, often freely branched from the upper axils. Leaves in whorls of 3–4 or opposite, lanceolate or ovate-lanceolate, acute, serrate, base rounded to the very short broad ciliate petiole, confluent by a hairy margin round the stem, glabrous above, thinly pilose-tomentose beneath; 4–6 in. long, 1–2 in. broad. Capitula about $\frac{1}{2}$ in. diameter, on tomentose peduncles of $\frac{1}{4}$–$\frac{1}{2}$ in. more or less, collected at the extremities in broad corymbose cymes; involucral scales ovate- to oblong-lanceolate, acute, firm, green or purplish upwards with a broad scarious whitish serrulate margin, innermost scales linear-oblong, wholly scarious. Corolla thinly glandular.

Nile Land. Abyssinia (coll. 1863 no. 1497), *Schimper!*

Var. *tomentosa.* Differing in the tomentose stem and under surface of the leaves.

Mozamb. Distr. Kilima Njaro, *Rev. C. New!*

Var. *longipes.* Leaves narrowed at base into a distinct petiole, denticulate, opposite, closely puberulous beneath. Peduncles 3 together, terminating the branches, exceeding the leaves. Flowers pale violet.

North Central. Monbuttu-land, *Schweinfurth!*

6. VERNONIA, Schreb.; Benth. et Hook. f. Gen. Pl. ii. 227.

Capitula homogamous, few- (very rarely 1-) or many-flowered. Involucre various in form, from cylindrical to subglobose urceolate hemispherical campanulate or turbinate; scales numerous, pauci- or multi-seriate, usually wholly free, various in form and texture, acute obtuse or with a terminal appendix. Receptacle naked, foveolate or fimbrilliferous. Corolla tubular or campanulate or gradually dilated above, usually equally 5-fid. Anther-base sagittate or obtuse, apex with a linear or lanceolate free connective. Achenes columnar or narrowed below or turbinate, 4–5-gonus or 8–20 costate or costæ evanescent, glabrous or hairy uniformly or in longitudinal series, in many species sessile-glandular between the costæ; with or without a distinct basal callus. Pappus 2- pluri-seriate, rarely 1-seriate, outer series usually shorter than the inner, setaceous or squamiform; inner usually setaceous barbellate, white or coloured, persistent or caducous.—Herbs, shrubs or trees. Leaves alternate, penniveined in African species, entire, serrate or dentate. Capitula variously cymose or panicled, rarely solitary. Florets purple reddish or white.

A very large genus common to the tropics and warmer regions of both hemispheres, most numerous in Brazil. With exceptions, all of the following species are peculiar to tropical Africa. Several important sections of the genus are not, or but imperfectly, represented in this Flora.

Inner bracts of the involucre persistent.
Bracts of the involucre without terminal appendage, none exceeding the capitula.
Outer pappus consisting of short squamellæ . . . . § i. LEPIDELLA.
Outer pappus consisting of setæ, sometimes minute or wanting.
Achenes obscurely costate or ecostate . . . . . § ii. TEPHRODES.
Achenes (3-) 4–6-costate . . . . . § iii. CYANOPIS.
Achenes 8–∞-costate.
Capitula with foliaceous bracts at the base . . . 34. *V. purpurea.*
Capitula without foliaceous bracts at the base.
Involucral bracts setaceous. Capitula on considerable peduncles . . . . . § iv. XIPHOLEPIS.
Involucral bracts not setaceous. Capitula paniculate . . . . . § v. DECANEURUM.
Bracts of the involucre elongated, the inner ones exceeding the capitula.
Leaves scabrous. Capitula 1½–3 in diam.; inner bracts of the involucre linear, rigid, purple . . . . . 51. *V. nigritiana.*
Leaves smooth. Capitula ½ in. diam.; bracts of the involucre filiform towards the apex, loose . . . 52. *V. filigera.*
Bracts of the involucre with terminal appendage . . . § vi. STENGELIA.
Inner bracts of the involucre caducous . . . . . § vii. STROBOCALYX.

§ i. LEPIDELLA.

Achenes glabrous on the 10 ribs. Pappus subrufous . . 1. *V. jugalis.*
Achenes glabrous on the 4–6 angles or ribs. Pappus white.
Climbing shrub, 10–15 ft. high . . . . . 2. *V. Biafræ.*
Herbs or small shrub, 1 ft. high.
Capitula about 12-flowered. A small shrub . . . . 3. *V. atriplicifolia.*
Capitula many-flowered. Herbs.
Capitula campanulate, ⅓ in. broad . . . . . 4. *V. pandurata.*
Capitula turbinate, ⅔ in. broad . . . . . 5. *V. turbinata.*
Achenes setulose at least on the angles or ribs. Pappus sordid tawny subrufous or violaceous.
Pappus sordid or pale tawny.
Capitula ½–1 in. broad, singly terminating the erect leafy branches.
Involucral scales acute, loosely tomentose . . . . 6. *V. Perrottetii.*
Involucral scales blunt, glabrate . . . . . 7. *V. Bainesii.*
Capitula ⅓–¾ in. broad, paniculate or solitary on divaricate peduncles.
Involucral scales densely pilose-hirsute or silky.
Tips of the involucral scales erect . . . . . 8. *V. ambigua.*
Tips of the involucral scales recurved . . . . 9. *V. Petersii.*
Involucral scales glabrescent, thinly pubescent or hirsute.
Capitula campanulate or subturbinate.
Involucral scales sub-obtuse, with short spreading apiculus . . . . . 10. *V. Steetziana.*
Involucral scales acute, with long patent apiculus 11. *V. Poskeana.*
Capitula hemispherical, rather hollowed at the base 12. *V. Kirkii.*
Pappus subrufous . . . . . 13. *V. demulans.*
Pappus (inner) violaceous . . . . . 14. *V. violacea.*

§ ii. TEPHRODES.

Fruticose. Leaves not conspicuously veined, ⅖–⅗ in. long . 15. *V. cinerascens.*
Herbaceous. Leaves veiny beneath, exceeding ¾ in. long.
Involucral bracts straight.

Leaves membranous, pale but not silvery-silky beneath.
Involucral bracts very acute . . . . . 16. *V. cinerea.*
Involucral bracts broader, not very acute . . . . 17. *V. undulata.*
Leaves subcoriaceous, silvery-silky beneath.
Upper surface of the leaves dark.
Leaves lanceolate or ovate, acutely acuminate . . 18. *V. Kraussii.*
Leaves narrowly elliptical, less acute; the lower ones obtuse . . . . . 19. *V. Smithiana.*
Upper surface of the leaves silvery-silky . . . . 20. *V. natalensis.*
Involucral bracts with recurved tips . . . . . 21. *V. uncinata.*

§ iii. CYANOPIS.

Pappus uniseriate (caducous) or sometimes with minute persistent coroniform outer row.
Erect herb. Leaves ovate. Achenes oblong with outer minute persistent pappus . . . . . 22. *V. Leopoldi.*
Decumbent herb. Leaves oblong. Achenes linear-oblong. Pappus single . . . . . 23. *V. misera.*
Shrubby. Leaves ovate-lanceolate. Achenes subturbinate, thickened above. Pappus single . . . . . 24. *V. Moramballæ.*
Erect herb. Leaves ovate. Achenes oblong-ovoid. Pappus single. Involucral scales green with white membranous margin . . . . . 25. *V. marginata.*
Pappus biseriate.
Pappus rufous or tawny.
Leaves tomentose beneath . . . . . 26. *V. zanzibarensis.*
Leaves glabrous or thinly pubescent beneath . . . . 27. *V. urticæfolia.*
Pappus white.
Achenes pilose . . . . . 28. *V. plumbaginifolia.*
Achenes setulose.
Capitula unilateral . . . . . 29. *V. Unionis.*
Capitula not unilateral.
Albido-sericeous . . . . . 30. *V. Aschersonii.*
Dull-feruginous.
Involucral scales narrowly oblong subacute . . 31. *V. karaguensis.*
Involucral scales linear acute . . . . . 32. *V. Burtoni.*
Achenes glabrous . . . . . 33. *V. blumeoides.*

§ iv. 'XIPHOLEPIS.

Achenes glabrous . . . . . 35. *V. Benthamiana.*
Achenes hairy.
Pappus triseriate . . . . . 36. *V. Melleri.*
Pappus duplex.
Perennial. Leaves linear . . . . . 37. *V. fastigiata.*
Annual. Leaves wider . . . . . 38. *V. pauciflora.*

§ v. DECANEURUM.

Achenes glabrous or very nearly so.
Pappus white. Leaves incise-dentate . . . . . 39. *V. pteropoda.*
Pappus ferruginous. Leaves subentire or sinuate . . . 40. *V. senegalensis.*
Achenes hairy.
Pappus sub-uniseriate . . . . . 41. *V. amygdalina.*
Pappus 2–∞-seriate.
Setæ of the pappus compressed . . . . . 42. *V. guineensis.*
Setæ of the pappus terete.
Acaulescent . . . . . 43. *V. gerberæformis.*
Stems several or branched.
Bracts of the involucre acute mucronate or apiculate, erect.

Involucres turbinate. Pappus pluriseriate.
Leaves linear.
Heads 1–1½ in. diam. . . . . 44. *V. infundibularis.*
Heads ⅜–¾ in. diam. . . . . 45. *V. Schweinfurthii.*
Leaves oval or oblanceolate-oblong.
Branches pubescent. Leaves narrowed at the base . . . . . 46. *V. obconica.*
Branches glabrous. Leaves rounded or obtuse at the base . . . . . 47. *V. glabra.*
Involucres campanulate. Pappus biseriate.
Scabrous . . . . . 48. *V. inulæfolia.*
Softly pubescent . . . . . 49. *V. Hochstetteri.*
Bracts of the involucre obtuse, muticous, usually reflexed at the apex . . . . . 50. *V. Quartiniana.*

§ vi. STENGELIA.

Achenes hispid. Corolla gradually narrowed.
Leaves glabrous or nearly so, or papillose-scabrid or thinly scattered with crisped hairs.
Heads ½–¾ in. diam. in broad cymes . . . . . 53. *V. abyssinica.*
Heads 1½–2 in. diam. (except n. 54, var.)
Involucral scales linear-lanceolate, acuminate . . 54. *V. Kotschyana.*
Involucral scales ovate-lanceolate, subacute . . . 55. *V. Buchingeri.*
Leaves tomentose beneath at least when young.
Heads ⅖–⅗ in. diam. . . . . 56. *V. firma.*
Heads 1–2 in. diam.
Appendix linear-lanceolate, plane, ascending. Heads numerous . . . . . 57. *V. tigrensis.*
Appendix ovate-lanceolate acute. Heads 3–5-nate. Petioles winged . . . . . 58. *V. Tenoreana.*
Appendix ovate acuminate with midrib. Heads 3–5-nate. Petioles distinct. (Leaves glabrescent.) 59. *V. Grantii.*
Appendix oblong-ovate or elliptical obtuse, muticous or mucronate, pubescent. Cymes broad . . . 60. *V. adoënsis.*
Appendix ovate-rotundate apiculate, recurved, tomentose. Heads 1–3 in forks or terminal . . 61. *V. shirensis.*
Achenes hispid. Corolla abruptly narrowed. Appendix lanceolate acute undulate squarrose. Heads 1–3-nate, with leafy bract. Petioles distinct . . . . . 62. *V. mossambiquensis.*
Achenes hispid. Herb of 2–4 in., leafless from woody stock.
Appendix obscure . . . . . 63. *V. pumila.*
Achenes glabrous or nearly so. Corolla abruptly narrowed.
Leaves glabrous or minutely hairy.
Leaves distinctly petiolate. Achenes subequally costate . . . . . 64. *V. insignis.*
Leaves narrowed into winged petiole. Costæ of achenes alternately narrower . . . . . 65. *V. Calvoana.*
Leaves tomentose beneath.
Intermediate involucral bracts ovate-lanceolate . 66. *V. Rothii.*
Intermediate involucral bracts elongate linear acuminate . . . . . 67. *V. hymenolepis.*

§ vii. STROBOCALYX.

Achenes glabrous.
Involucral bracts purple . . . . . 68. *V. cylindrica.*
Involucral bracts not coloured.
Heads large, 1¼–1¾ in. diam. . . . . 69. *V. frondosa.*
Heads narrow, ⅙–⅓ in. diam.
Trees, 15–25 feet high.

Leaves petiolate. Heads 10–18-flowered . . .	70. *V. conferta.*
Leaves sessile. Heads 8-flowered	71. *V. theophrastifolia.*
Shrubs about 6 feet high.	
Panicle loosely pyramidal. Heads ¼ in. diam., ½ in. long	72. *V. Doniana.*
Panicle densely corymbose. Heads ⅙ in. diam., ¼ in. long	73. *V. Thomsoniana.*
Herb, 3–4 feet high	74. *V. Livingstoniana.*
Achenes more or less hairy.	
Leaves auriculate at the base, sessile	75. *V. myriocephala.*
Leaves narrowed at the base, petiolate.	
Lower surface of the leaves hoary-tomentose	76. *V. podocoma.*
Lower surface of the leaves puberulous or glabrate.	
Petioles tawny-velvety	77. *V. Francavillana.*
Petioles pubescent or glabrate	78. *V. myriantha.*

1. **V. jugalis,** *O. & H.* Herb 7–8 feet. Branches striate, puberulous below, tomentellous above. Leaves obovate or oval, cuspidate-acuminate, attenuate below into a short petiole, subglabrous above, softly tomentellous below, 1–3 by ⅓–⅚ in. Heads campanulate, about 30-flowered, ⅓–½ in. long, on bracteolate pedicels ranging up to ¾ in., in a dense corymbose cyme of 6 in. diameter; bracteoles linear-setaceous, minute. Involucral bracts multiseriate, linear or the outer ones linear-lanceolate, acute or apiculate or the innermost obtuse, puberulous, the outer successively shorter, the outermost minute. Flowers rose-lilac. Achenes ⅒ in. long, 10-ribbed, the ribs sometimes approximated in pairs, setulose between the glabrous callous ribs. Pappus duplex, subrufous, the inner setiform nearly ¼ in. long scabrous, the outer very short of somewhat squamiform setæ. Receptacle not alveolate.

North Central. Monbuttu-land, *Schweinfurth!*

2. **V. Biafræ,** *O. & H.* A climbing shrub 10–15 ft. high. Branches subangular, striate, puberulous. Leaves alternate, ovate, acute, narrowed at base into petiole, thinly membranous, sinuate denticulate or subentire, nearly glabrous, minutely glandular, 1¼–2½ in. long by ½–1½ in. wide; petioles ⅙–⅓ in. long. Capitula campanulate, 12–15-flowered, ¼–⅓ in wide, on pedicels ⅙–⅓ in. long, in terminal rather lax hemispherical panicles 4–6 in. in diameter. Scales of involucre pluriseriate, outer lanceolate, inner narrowly elliptical, 1-nerved, blunt or subapiculate, pubescent and glandular outside; inner caducous. Receptacle areolate glabrous. Corolla gradually narrowed. Achenes 5-costate, with a few scattered intercostal setæ. Pappus duplex, scabrid, white; inner setæ caducous, outer short narrowly linear-lanceolate ciliate.

Upper Guinea. Cameroon Mountains, fl. December, *Mann!*

3. **V. atriplicifolia,** *Jaub. et Spach Ill. Pl. Or.* iv. p. 94, t. 359; *non Sond.* A small shrub ranging up to 3 ft. high with numerous dichotomous spreading branches, covered as well as the leaves and involucre with close whitish sericeous stiff hairs and scattered with sessile glands.

Leaves alternate, ovate and varying from oval to rhomboidal, pointed or rounded at apex, narrowed or rounded at base, with 1–3 coarse teeth on each side, fleshy, small, subsessile or shortly stalked, ranging up to ½–1 in. long by ¼–½ in. broad. Capitula subturbinate, about 12-flowered, on pedicels ¼–½ in. long, in terminal dichotomous or numerous small congested cymes, forming a diffuse leafy panicle. Scales of the involucre 15–18, pluriseriate, from ovate to oblong-lanceolate, acute, outer smaller, subdivergent. Receptacle naked. Corolla gradually narrowed, glandular. Anther-base acutely produced, -tips lanceolate. Achenes obtusely 5-sided, with short ascending white setæ between the ridges. Pappus duplex, outer of short equal linear pointed squamæ, inner of white barbellate caducous setæ.—*V. spathulata*, Schultz. Bip. ex Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 162 in note, non Hochst.; *? Chrysocoma spatulata*, Forsk. Fl. Ægypt.-Arab. p. 147, n. 70; *V. arabica*, Decaisne ex Boiss. Fl. Orient. iii. p. 154.

Nile Land. Red Sea, *Nimmo!* Soumali, *Hildebrandt!*
Occurs also in Arabia.
Cf. *V. cinerascens*, Schultz Bip.

4. **V. pandurata,** *Link; DC. Prodr.* v. p. 27. Erect simple herb of 1½–4 ft.; stem slender, terete, faintly striate, pubescent. Leaves alternate, obovate or elliptical, obtuse, lower more or less narrowed below into a winged petiole, auricled and amplexicaul at base, upper sessile auriculate, crenate-serrate, thinly pubescent above, paler pubescent-tomentose beneath, 1–3 in. long, ½–1½ in. broad, upper gradually smaller and subentire. Capitula campanulate ⅓ in. diameter, many-flowered on slender pedicels of ¼–1 in. in lax divaricate corymbose terminal panicles ⅙–1 ft. wide or more. Scales of involucre pluriseriate, appressed, obtuse, glandular below, purplish towards apex, outer ovate, inner linear-oblong. Receptacle glabrous, not narrow. Corolla red or purplish, glabrous. Achenes with 5–6 glabrous prominent ribs and appressed sparsely setose interspaces, callus-based. Pappus duplex white; outer persistent coroniform; inner barbellate caducous.

Lower Guinea. Congo, *Chr. Smith! Burton!* (flowers in September. Native name *Sunsa*); Loango, *Soyaux!* Ambriz, Angola, *Monteiro!*

5. **V. turbinata,** *O. & H. in Trans. Linn. Soc. Lond.* xxix. p. 90, t. 56, fig. B. Large herb, covered on the terete striate branches, under side of leaves, and inflorescence with a close whitish tomentum. Upper leaves alternate, elliptic-oblong, broadly or obtusely pointed, somewhat narrowed at base, subsessile, entire or obsoletely denticulate, scabrous and dark green above, 2½ in. long, ⅔ in. broad. Capitula turbinate, many-flowered, ⅔ in. wide, on thick unequal pedicels up to 1 in. long, in an elongated terminal panicle. Scales of involucre numerous multiseriate, linear-lanceolate, densely tomentose, tipped with a dark green, glabrous, rigid, subpatent apiculus. Corolla gradually narrowed, purple, lobes thinly pilose above. Anthers acutely produced at base; apical connective linear-lanceolate, acute. Achenes 4–5-ridged, sparsely setulose between the ridges, otherwise glabrous.

Pappus white, duplex, barbate, outer very short, narrowly squamiform, inner stout rigid setiform, caducous.

Nile Land. Woods on dry ground, Madi (Vernonia No. 5, Speke, Journ. App. 637), *Speke and Grant!*

6. **V. Perrottetii,** *Sch. Bip. in Walp. Rep.* ii. 947. Annual, erect from a woody base, 1½–2 ft. or more in height, usually copiously branched at least above, leafy; stem terete striate pubescent or closely puberulous. Leaves alternate, ascending, narrow-linear, revolute more or less when dry, scabrid, ⅔–2 in. long. Capitula ½–1 in. diameter, campanulate solitary, terminating the numerous ascending branches, forming a loose cymose panicle. Scales of involucre pluriseriate appressed outer much shorter, lanceolate; inner linear-lanceolate acute, loosely tomentose, pale, with greenish tips traversed by a prominent paler midrib. Receptacle convex alveolate glabrous. Corolla gradually narrowed, sessile-glandular, purple, limb unequally lobed. Anthers shortly sagittate at base, acute-tipped. Achenes with about 8–9 (some obscure) hispid ridges and numerous sessile glands between them, callus-based. Pappus duplex, inner barbellate, outer narrowly squamiform, very short, dirty white.—Oliv. in Trans. Linn. Soc. Lond. xxix. t. 56, fig. A.; *Polydora stæchadifolia*, Fenzl in Flora, 1844, 312; *V. stæchadifolia*, Sch. Bip. in Walp. Rep. vi. 98; *Webbia serratuloides*, DC. Prod. v. 72, fide Sch. Bip. in Schweinf. Fl. Æthiop. 162.

Upper Guinea. Niger, *Barter!* Dahomey, *Burton!* Gambia, *Ingram! Whitfield!*

Nile Land. Sennaar, *Kotschy!* Cordofan, *Cienkowsky;* Madi, *Speke and Grant!* (mixed with *Hygrophila spinosa*, T. And.; burnt salt is extracted from their ashes); Unyoro, *Speke and Grant!* Djur Land, *Schweinfurth!*

7. **V. Bainesii,** *O. & H.* Herb of 1 ft. more or less; stems erect leafy, probably from a woody stock, conspicuously striate from the leaf-midribs, sparsely strigillose or glabrate; simple below, branching above. Leaves narrow-linear, acute, strongly revolute, glabrate, glandular-pitted with depressed median line above, midrib paler, conspicuous beneath, ½–¾ in. long. Capitula campanulate ¾ in. long and broad, singly terminating the erect upper leafy branches; scales multiseriate appressed obtuse muticous or mucronulate, with a subprominent midrib above, glabrate; outer and median scales elliptic-ovate to obovate, inner linear-oblong. Achenes hispid, obscurely 10-costate. Pappus duplex, sordid, outer very short, narrowly squamiform, inner often broadly setaceous barbellate.

South Central? "South African Gold Fields," *T. Baines!*

8. **V. ambigua,** *Kotschy et Peyr. Pl. Tinn.* 35, t. 17 B. Annual, erect ½–2 ft. Stem terete, striate, loosely pilose-pubescent, leafy. Leaves alternate, oblanceolate or linear-oblanceolate, obtuse, attenuate to a subauricled base, sessile, somewhat scabrous, thinly hairy or puberulous, denticulate or subentire, membranous, varying to 4 in. in length, ⅓–1 in. broad. Capitula nearly hemispherical, ½–¾ in. diameter, shortly pedicellate in terminal pilose or pubescent corymbose cymes,

sometimes broad lax 1 ft. in. diameter in the taller specimens. Scales of involucre pluriseriate, subappressed, densely pilose with loose whitish hairs, linear-subulate, acute, darker or purplish at the tip. Receptacle deeply alveolate. Corolla purple, gradually narrowed, scattered with small sessile glands. Anther-base shortly pointed, acute. Achenes 5-angled, angles hispid, glandular between, callus-based. Pappus whitish duplex persistent barbellate, outer short squamiform, inner ¼ in. long erect.

Upper Guinea. Niger, *Barter!*

Nile Land. Madi, *Speke and Grant!* (Journ. App. 637. *Vernonia* No. 3); between rivers Bahr-Dembo and B-Djur, in fields of Sorghum, *Heuglin;* Djur-Land, *Schweinfurth!*

9. **V. Petersii,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 90. Herb of 1–3 ft.; stems erect or ascending, sparingly branched, striate, subangular, shortly crisped or scabrid-pubescent from a short woody stock. Leaves alternate, linear or ovate-oblong or oblanceolate, obtuse or acute, mucronate, narrowed to the sessile or subsessile base, scabrous above, scabrous-pubescent beneath; 1–4 in. long, ⅓–⅔ in. broad. Capitula campanulate-hemispherical, ½ in. broad, about 50-flowered, in few-headed narrow panicles, subsessile or lateral peduncles varying to ¾ in. Scales of involucre pluriseriate, linear or linear-lanceolate, acute, the outer silky-pilose, inner obscurely 3-nerved; tips of outer scales recurved; receptacle alveolate. Corolla-tube and lobes thinly setulose, tube gradually narrowed. Anther-base sagittate. Achenes obconical, unequally 4–5-gonous, setulose chiefly on the angles, sessile-glandular and at length tubercular-scabrid between, with few or no setæ. Pappus duplex, scabrid, pale tawny; outer squamiform scales lanceolate acute denticulate above; inner setæ rigid fragile caducous.—*Crystallopollen latifolium*, Steetz in Peters' Mossamb. Bot. 364, t. 48*a*.

Nile Land. Karague (Speke Journ. App. p. 637, *Vernonia*, n. 8), *Speke and Grant!* fl. December.

Mozamb. Distr. Boror and Rios de Sena, *Dr. Peters!*

We have the same plant sent by Mr. Baines from the "South African Gold Fields," 1870.

10. **V. Steetziana,** *O. & H.* Erect pubescent slender annual of 1–3 ft., branches costate slightly hairy scaberulous. Leaves subcoriaceous, rigid, linear, narrowed to each end, entire, margin revolute, scabrid above, paler usually hairy and punctate beneath, lower 1–3 in. long 1–2 lines broad. Capitula campanulate about 50-flowered, ½ in. long ⅓ in. broad, on pedicels of ½–2 in., forming ample much-branched many-headed panicles; involucral scales 4–5-seriate, hirsute or thinly villous, linear-lanceolate subobtuse and apiculate with short spreading tips. Achenes of *V. Petersii*, but angles (5–7) with slightly longer more crowded hairs and faces less rugose, sessile-glandular.—*Crystallopollen angustifolium*, Steetz in Peters' Mossamb. Bot. 366, var. β. *chlorolepis*, Steetz, l.c.

Mozamb. Distr. Inhambane, *Peters!* Kaimba Island, opposite Tette, *Kirk!*

11. **V. Poskeana,** *Vatke et Hildebrandt in Oesterr. Bot. Zeitschr.*, 1875, p. 324. An erect simple or branched slender annual, 1–3 ft. high. Stem terete, striate, softly and inconspicuously pubescent, leafy. Leaves alternate, linear, acute, attenuate to a slightly dilated and sessile base, repand or entire, thinly puberulous, glandular, ranging up to 3 in. long by $\frac{1}{4}$ in. broad. Capitula subturbinate, $\frac{1}{3}$ in. wide, many-flowered, on pedicels $\frac{1}{10}$–$\frac{3}{4}$ in. long, in a terminal corymbose panicle 2–3 in. wide. Scales of the involucre multiseriate, outer ovate-lanceolate, inner linear-oblong, acute, with a long dark setiform patent apiculous, pubescent; receptacle not alveolate. Corolla gradually narrowed, purple. Anther-base acutely produced. Achenes (immature) shortly hairy; hairs sub-5–7-seriate. Pappus duplex, sordid; outer squamiform with lanceolate imbricating squamæ, inner setæ rather few, barbellate, deciduous.—*Crystallopollen angustifolium*, Steetz in Peters, Mossamb. Bot. p. 366, *a.* forma *vulgaris*, Steetz, l.c.

Mozamb. Distr. Zambesia, Shupanga, fl. June, *Dr. Kirk!* Zanzibar Island, *Hildebrandt!* Rios de Sena, *Peters!*

12. **V. Kirkii,** *O. & H.* Herb of $1\frac{1}{2}$–3 ft. from a short woody stock. Stem erect, branched above, angular, striate, shortly and thinly pubescent, glabrescent. Leaves alternate, linear or linear-oblong, narrowed to each end, acute, upper sessile or subsessile, lower with a short winged petiole, scabrid above, thinly pubescent beneath, 3–4 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad. Capitula hemispherical, $\frac{1}{2}$–$\frac{2}{3}$ in. diameter, many-flowered, terminal and axillary, solitary on shortly pubescent peduncles 1–$3\frac{1}{2}$ in. long. Scales of involucre pluriseriate, thinly pilose above, scarious with herbaceous midrib, with a darker patent or recurved apiculus, outer smaller lanceolate, inner oblong; receptacle not alveolate. Anther-base obtuse. Achenes 8–10-costate, sparingly pilose on the ribs and with some sessile glands between. Pappus duplex, barbate, sordid; outer squamiform linear-lanceolate ciliate, inner caducous.

Mozamb. Distr. Zambesia, Shupanga and Mazzano, *Dr. Kirk! Dr. Stewart!*

13. **V. demulans,** *Vatke in Oesterr. Bot. Zeitschr.*, xxvii. p. 195 (1877). An erect herb $1\frac{1}{2}$–2 ft. high, branched at least above. Branches terete striate, patently and appressedly rufous-pubescent. Leaves alternate, oblong or ovate or obovate-oblong, acute, rounded or narrowed at base, subsessile, entire or subentire, appressedly pubescent and squamulose, 1–2 in. long by $\frac{1}{3}$–$\frac{1}{2}$ in. wide, without lateral veins. Capitula subhemispherical, 12–20-flowered, on unequal pedicels up to 1 in. long, in divaricate lax cymes 6–8 in. wide. Scales of the involucre pubescent, pauciseriate, outer ones subulate, ciliate, inner lanceolate-linear longer apiculate. Receptacle glabrous, $\frac{1}{10}$–$\frac{1}{8}$ in. wide. Corolla glabrous, gradually narrowed, purple. Anther-base shortly produced. Achenes tetragonous, 4-costate, narrowed to callous base, setulose, sessile-glandular. Pappus duplex, subrufous; outer squamiform short lanceolate; inner setæ barbellate, deciduous.

Mozamb. Distr. 6° 8′ S. Lat. East Coast, *Forbes!* Zanzibar Coast, at Mombassa, *Kirk! Hildebrandt!*

14. **V. violacea,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 91. An erect branching herb 2–3 ft. high. Branches ascending, subangular, striate, appressedly pubescent. Leaves alternate, obovate-oblong, rounded at apex, base blunt, subsessile, crenate-dentate, with few scattered hairs on both sides especially towards the base beneath or glabrate, up to 3 in. long by $1\frac{1}{8}$ in. broad or more. Capitula hemispherical, many-flowered, $\frac{1}{2}$–$\frac{2}{3}$ in. wide, solitary terminating numerous erect naked striate puberulous peduncles 1–3 in. long. Scales of involucre 3–4-seriate, lanceolate or inner narrowly lanceolate-oblong, thinly tomentose outside, acutely apiculate, purplish towards the tip, subappressed. Receptacle alveolate glabrous. Achenes usually tetragonous, setulose, turbinate. Pappus duplex; outer squamiform, squamæ narrowly elliptic-lanceolate, denticulate; inner setiform violaceous, scabrid.

Nile Land. Madi, fl. December (Journ. App. p. 637, *Vernonia*, n. 7), *Speke and Grant!* common, in woods.

15. **V. cinerascens,** *Sch. Bip. in. Schweinf. Fl. Æthiop.* 162. A much branched shrub of 1–3 ft., branches terete covered when young as well as the leaves with white short appressed pubescence mixed with small sessile glands (the hairs attached by the middle). Leaves alternate, obovate-spathulate, rounded or obtuse at apex, attenuate at base, sessile, venation obscure, entire or with a few teeth, $\frac{1}{3}$–$\frac{2}{3}$ in. long by $\frac{1}{10}$–$\frac{1}{6}$ in. wide. Capitula about 10-flowered, of a rich purple or maroon colour, campanulate, scarcely $\frac{1}{4}$ in. wide, on pedicels $\frac{1}{10}$–$\frac{1}{2}$ in. long, in diffuse axillary and terminal dichotomous cymes 1–4 in. wide. Scales of the involucre pluriseriate, lanceolate to oblong, apiculate, pubescent with greenish midrib above, lower smaller. Receptacle narrow, glabrous. Corolla purple, gradually narrowed. Anther-base obtuse. Achenes with 8–10 obscure ridges, with ascending setæ, very minutely pulverulent-glandular below the setæ. Pappus duplex, barbellate, outer very short.—*V. spathulata*, Hochst. in Hb. Schimp. Abyss., 1854, 2133, non Schultz Bip.

Nile Land. Abyssinia, alt. 3–4000 ft., flowers in August, *Schimper!*
Occurs also in North-West India.
Very like *V. atriplicifolia*, Jaub. et Spach, but differs by the outer pappus being setaceous not linear-squamiform; Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 323 unites the two species.

16. **V. cinerea,** *Less.*; *DC. Prodr.* v. p. 24. An erect herb, branched above, 2–5 ft. high. Stem terete, striate, more or less shortly pubescent. Leaves alternate, from ovate to obovate, apex acute or rounded, cuneate or attenuate at base into a short petiole slightly dilated at base, serrulate-dentate or subentire, puberulous or subscabrid above, paler pubescent and veined beneath, 1–2 in. long by $\frac{1}{3}$–1 in. wide. Capitula campanulate, $\frac{1}{4}$ in. wide, about 15-flowered, on slender pedicels $\frac{1}{4}$–1 in. long, in axillary and terminal many-headed cymes. Scales of the involucre lanceolate-linear, very acute, pluriseriate, pubescent and with minute glands, not appressed, ultimately reflexed; outer filiform, patent. Receptacle convex, glabrous. Corolla-tube

slender, scarcely dilated above, reddish Anther-base shortly sagittate. Achenes subterete, ecostate, uniformly setulose with short white appressed hairs, with small basal callus. Pappus duplex, white, outer very short, inner barbellate, caducous.—*Chrysocoma violacea*, S. et T. Pl. Guin. 384, ex DC. l. c.

Widely spread in Tropical Africa, North and South of the Equator.

17. **V. undulata,** *O. & H.* Erect herb of 2 ft. or more. Stem striate, puberulous; branches at an acute angle, leafy. Leaves ovate, the upper ones lanceolate, narrowed at both ends, undulate, repand, apiculate, membranous, puberulous and green on both sides, shortly petiolate, 1–2 by $\frac{1}{6}$–$\frac{3}{4}$ in. Heads hemispherical or campanulate, $\frac{1}{4}$–$\frac{1}{2}$ in. diam., about 20-flowered, on pedicels of $\frac{1}{4}$–$1\frac{1}{4}$ in., bracteolate, in a rather lax corymbose cyme 6 in. diam.; bracteoles linear-setaceous minute. Inner involucral bracts equal, $\frac{1}{8}$ in. long, linear-oblong, obtuse or apiculate but not acute, pubescent, about 12 in two rows, outer linear-setaceous short, few. Flowers rose-blue. Achenes $\frac{1}{10}$ in. long, pilose, indistinctly costate. Pappus white, biseriate, all setiform, outer very short.

Nile Land. Niamniam-land, near Gumba, *Schweinfurth!*

Lower Guinea. Angola, Quiballa to Bembe, *Monteiro!* (A form with larger broader leaves ranging up to $3\frac{1}{2}$ by $1\frac{1}{2}$ in.; involucral bracts elliptic-oblong, acutely acuminate; flowers purple. 3 feet high. Perhaps a distinct species.)

18. **V. Kraussii,** *Sch. Bip.; Walp. Rep.* ii. p. 947. Stem simple erect $1\frac{1}{2}$–3 ft., clothed like the leaves beneath with silvery subappressed tomentum. Leaves alternate, ovate or elliptic-lanceolate, acute or acuminate, base cuneate or rounded, upper surface glabrate or more thinly silky than the lower, which is strongly marked with oblique ascending lateral nervures, $\frac{3}{4}$–2 in. long, $\frac{1}{4}$–$\frac{5}{6}$ in. broad; petiole very short. Inflorescence and capitula nearly as in *V. natalensis.* Achenes silky-tomentose, hairs obscurely 5-seriate. Pappus duplex, setaceous, white; outer very short.—*Webbia elæagnoides*, DC. Prodr. v. 73. *V. elæagnoides*, Schultz Bip. in Flora 1844, p. 668, non H. B. K.

South Central. Sent by Mr. Baines along with a number of specimens collected North of the Tropic in South Central Africa, without special label. It occurs also in Natal, the Macalisberg, &c.

19. **V. Smithiana,** *Less. in Linnæa*, 1831, p. 638 (*ex descr.*), 1–2 ft. high, woody at base, with several erect striate leafy silvery-pubescent subangular stems, simple or slightly branched above from a woody stock. Leaves alternate, ascending, narrowly elliptic- or lanceolate-oblong or varying to ovate-elliptical, subsessile, blunt or subacute, narrowed at base, glabrescent and reticulate above, silvery-sericeous beneath, 1–$2\frac{1}{2}$ in. long by $\frac{1}{5}$–$\frac{2}{5}$–1 in. wide. Capitula hemispherical, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, about 15-flowered, on pedicels $\frac{1}{4}$–$\frac{2}{3}$ in. long, in small rather dense terminal panicles. Scales of the involucre narrowly elliptic-oblong, in few rows, obtuse, mucronulate, tomentose. Receptacle glabrous. Corolla-tube gradually narrowed; lobes thinly pilose. Anther-base shortly produced. Achenes pilose, obscurely 8–10-costate, callus-based. Pappus biseriate, outer setæ minute, barbate,

nearly white, very slightly tawny.—*Webbia? Smithiana*, DC. Prodr. v. 72.

Nile Land. Djur-land (form with broader leaves), *Dr. Schweinfurth!* Karaguè, No. 408 (Speke, Journ. App. p. 637, *Vernonia*, n. 4), *Speke and Grant!*
Lower Guinea. Congo, *Chr. Smith!*

20. **V. natalensis,** *Sch. Bip.; Walp. Rep.* ii. p. 947. Stem simple, erect, striate, 1–2 ft., with the leaves clothed with an appressed silvery tomentum. Leaves alternate, linear-oblanceolate to linear, lower rather obtuse and mucronate, upper subacute, narrowed to the base, entire, strongly nerved beneath with the lateral nerves directed forwards at an acute angle, 2–3 in. long, 3–5 lines broad. Capitula $\frac{1}{3}$ to $\frac{1}{2}$ in. in expansion, on peduncles of $\frac{1}{4}$–1 in. in silvery-hoary corymbose terminal cymes $1\frac{1}{2}$–4 in. diam. Receptacle foveolate. Scales lanceolate with setaceous tip, inner oblong apiculate. Anthers bifid at base, contiguous lobes cohering. Achenes silky obscurely 10-nerved. Pappus biseriate, whitish, barbellate, outer shorter.—*Webbia aristata*, DC. Prodr. v. 73. *V. aristata*, Schultz Bip. in Flora, 1844, p. 667, non Less.

Mozamb. Distr. "Near Moramballa," *Dr. Kirk!*
Also at Natal.

21. **V. uncinata,** *O. & H.* A stout erect softly pubescent-tomentose annual 1 ft. or more in height. Stem terete striate. Leaves crowded, alternate, broadly ovate obtuse abruptly contracted into a winged petiole, crenulate, ranging to 2 in. long and broad; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. Capitula hemispherical, many-flowered, $\frac{1}{2}$ in. diam., on pedicels varying to 1 in. in terminal and axillary cymes. Scales of involucre outer small linear acute recurved, inner linear-lanceolate or acuminate with recurved tips, obscurely 3-nerved within, pilose. Corolla sessile-glandular; lobes minutely setulose. Anther-base acute. Achenes (immature) hirsute, obscurely ribbed. Pappus biseriate barbellate white, outer short, inner rigid.

Nile Land. Abyssinia, fl. April, *Dr. Roth!*

22. **V. Leopoldi,** *Vatke in Linnæa* xxxix. p. 478 (1875). Erect herb of 2–3 ft., often shrubby below; branches terete puberulous or hoary with a minute crisp tomentum. Leaves ovate to ovate-lanceolate, acute, serrate, more or less rounded and then occasionally cuneately narrowed into the petiole, minutely subscabrid-hispid above, reticulate, hoary-tomentose or sometimes concolorous and thinly pubescent, often with scattered sessile glands beneath, $2\frac{1}{2}$–4 in. long, 1–2 in. broad; petiole $\frac{1}{6}$–$\frac{3}{4}$ in. Capitula $\frac{1}{4}$–$\frac{1}{2}$–$\frac{3}{4}$ (in *hypoleuca*) in. diam. numerous broadly campanulate in terminal puberulous or tomentose corymbose cymes 2–3 to 8–10 in. broad. Involucral scales linear-lanceolate acute green or purplish. Anther-cells caudate below. Achenes varying in length, $\frac{1}{12}$–$\frac{1}{8}$ in., usually acutely 5-angled, often with a few minute scattered hairs above, almost or quite destitute of resin-glands. Pappus scabrous-barbellate, caducous, from within a minute toothed border.—*Oyanopis Leopoldi*, Sch. Bip. in Walp. Rep. ii. 949,

Rich Fl. Abyss. i. 381 ; *C. hypoleuca*, Sch. Bip.; Walp. Rep. vi. p. 98, Rich l. c. 382 ; *V. Bipontini*, Vatke *l. c.*

Nile Land. Abyssinia, *Schimper ! Petit ! Pearce ! Salt !*

Variable in the size of the heads, in presence and amount of resin-glands on florets and achenes, and also in the indumentum of the leaves.—On these differences W. Vatke, *l. c.*, separates this into two species.

23. **V. misera,** *O. & H.* Annual, decumbent, pilose-pubescent herb. Stem-leaves linear-oblong to oblong-oblanceolate, scarcely 1 ft. high, obtuse or broadly pointed, narrowed to the base, denticulate, hispid or hispid-pilose beneath, 1–1½ in. long. Capitula ¼ to nearly ½ in. in expansion, subhemispherical, shortly pedicelled or subsessile, in few-flowered interrupted cymes on terminal peduncles of 1–3 in., forming a diffuse somewhat paniculate inflorescence; bracts linear-lanceolate acute greenish above, apex often spreading or subrecurved. Anther-base acutely bifid. Achenes 4–5-gonous with a few sessile glands and short scattered hairs; pappus very caducous, bristles stiff scabrous-hispid, with no trace of outer persistent corona.

Lower Guinea. Congo, *Chr. Smith !*

24. **V. Moramballæ,** *O. & H.* Probably a shrub, wholly minutely tawny-tomentose; branches terete, leaf-scars prominent. Leaves numerous towards the extremities lanceolate or ovate-lanceolate, acute, coarsely serrate, subcoriaceous, closely gland-dotted hoary and reticulate beneath, subscabrid-puberulous above, 2 in. long more or less, base narrowed into petiole of ⅓ in. or less. Capitula numerous, ¼ in. diam. campanulate, in terminal hoary corymbs overtopping the leaves, peduncles not exceeding involucre; scales of involucre multiseriate, outer minute tomentose, inner oblong-lanceolate scarious. Corolla gradually narrowed and thinly glandular below. Achenes (young) subturbinate, costate, much thickened around the depressed apex and short persistent style-base. Pappus single, bristles excessively caducous, stout, barbed.

Mozamb. Distr. Zambesi Land, Moramballa, 3000 ft., *Dr. Kirk !*

25. **V. marginata,** *O. & H.* Erect herb; branches fulvous, softly and appressedly pubescent above, obscurely striate. Leaves (upper) ovate, apiculate, narrowed to subsessile base, entire or obsoletely denticulate, dark green and slightly hairy above, pinnately veined and covered with short white tomentum beneath, 1–3 in. long by ⅓–1 in. wide. Capitula widely campanulate, many-flowered, ¼ to ⅓ in. wide, on unequal pedicels, in a moderately dense terminal corymb 3 in. or more wide. Scales of the involucre pluriseriate, persistent, lanceolate, acute, apiculate, green with scarious margins, slightly pubescent outside; outer successively shorter. Anther-base obtuse. Achenes oblong-obovoid, with about 4 ribs, glabrescent, ⅛ in. long. Pappus uniseriate, rigid, nearly white, very caducous, setæ comparative few, barbellate.

Mozamb. Distr. Shire, *Dr. Stewart !* flowers in September.

26. **V. zanzibarensis,** *Less.; DC. Prodr.* v. p. 30. Shrub; branches terete, obscurely striate, tawny villous-tomentose. Leaves

alternate, membranous, more or less elliptical, apiculate, obtuse or suddenly narrowed at base, denticulate or repand-dentate, dark and puberulous or thinly pilose above, pale slightly tawny and tomentose beneath, ranging up to 4 in. long and 2 in. wide. Petioles about $\frac{1}{2}$ in. long, villous-tomentous. Capitula about 12-flowered on unequal pedicels, in rather dense corymbose or rounded terminal panicles 3–6 in. wide. Bracts linear or filiform. Receptacle small convex glabrous. Scales of the involucre rather few, narrowly lanceolate, apiculate, villous; inner oblong-lanceolate nearly glabrous, lower at length spreading, somewhat smaller. Corolla gradually narrowed, sessile-glandular; lobes hair-tipped. Anther-base shortly produced. Achenes pale, 5-angled, with a few sparse short setæ between the angles. Pappus scabrous, reddish, duplex; outer setæ few, very short.

Mozamb. Distr. Zanzibar, *Bojer, Dr. Kirk! Peters! Hildebrandt!* (in dry places).

27. **V. urticæfolia,** *Rich Fl. Abyss.* i. 378. Diffuse or scandent shrub of 2–3 ft. or more, with terete striate often flagelliform branches glabrous or pubescent at the extremities. Leaves alternate, ovate narrowly elliptical or lanceolate, acute or acuminate, narrowed to the base, glabrous or scabrid above and thinly pubescent beneath, serrulate crenate-denticulate or subentire, 2 or 3 to 5 in. long, 1–$1\frac{1}{2}$ in. broad; petioles short, varying to $\frac{1}{4}$ in. Capitula campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., shortly pedicellate in crowded or lax axillary and terminal cymes collected in ample panicles. Scales of involucre 3–4-seriate, obtuse or subobtuse, with or without a mucro, outer ovate, inner longer, oblong, nearly glabrous. Corolla gradually narrowed. Anther-base shortly sagittate. Ovaries obscurely 8–10-costate (the alternate ribs weaker and not reaching the base), glabrous, callus-based. Achenes 4–5-costate (*ex Vatke*). Pappus biseriate or subimbricate, setiform, subequal, barbellate, subferruginous, outer shorter.—*V.* (Cyanopis) *flagellaris,* Vatke in Linnæa, xxxix. p. 479 (1875).

Nile Land. Abyssinia, *Petit! Schimper!* Ankober *Roth!*

28. **V. plumbaginifolia,** *Fenzl, in Flora,* 1844, p. 312. Herbaceous, $1\frac{1}{2}$–2 ft. high, much branched from a woody stock; branches terete, striate, puberulous. Leaves alternate, obovate-oblong or the upper linear, rounded at the apex or the upper ones obtusely pointed or apiculate, narrowed at the base, puberulous, entire, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{20}$–$\frac{1}{3}$ in. wide, sessile or subsessile. Capitula subcampanulate, many-flowered, $\frac{1}{3}$ in. wide, on slender pedicels varying to $1\frac{2}{3}$ in. in divaricate much branched terminal cymes. Scales of the involucre pauciseriate, outer lax lanceolate, inner oblong, lanceolate and acute at apex, purplish and pubescent towards tip and sessile-glandular outside, glabrous inside, 3-nerved. Corolla sessile-glandular, gradually and uniformly narrowed. Achenes 4–5-sided and -costate, pilose, obscurely sessile-glandular. Pappus duplex, barbate, sordid; outer setæ short.

Nile Land. Sennaar, *Kotschy!* Bongo-land, *Schweinfurth!*

29. **V. Unionis,** *Schultz Bip. in Walp. Rep.* ii. p. 945. Stem herbaceous, erect, from a tomentose-tufted stock, terete, striate, thinly tomentose especially above or glabrescent, leafy, 3–4 ft. high. Leaves alternate, ovate or ovate-elliptical, upper lanceolate, acute, narrowed into the dilated petiole, dentate-serrate, scaberulous above, thinly appressed-tomentose or glabrate beneath, varying to $\frac{1}{2}$ ft. long by 3 in. broad; petiole $\frac{1}{2}$ in., more or less. Capitula many-flowered, $\frac{1}{2}$ in. diam., usually shortly pedicellate, unilateral, on the spreading branches of a broadly corymbiform terminal panicle $\frac{1}{4}$–1 ft. diam. Involucral scales multiseriate, recurved or subpatent above, acute or acuminate, more or less tomentose, outer shorter, subulate, inner oblong or oblanceolate-linear. Receptacle naked. Corolla gradually narrowed, rose-purple. Anther-base shortly produced, acute. Achenes 5- (6-)costate, with minute intercostal setæ; callus prominent. Pappus whitish, duplex, outer setæ minute, inner scabrous, caducous.

Nile Land. Abyssinia, *Schimper !* Gallabat, *Schweinfurth !*
The dried branches are used for torches (Rich Fl. Abyss. i. p. 375).

30. **V. Aschersonii,** *Sch. Bip. in Schweinf. Fl. Æthiop.* p. 161. Diffuse, much branched, from a shrubby base, about 1 ft. high; branches terete, extremities and leaves clothed with a soft short appressed white pubescence. Leaves alternate, thinly coriaceous, oblanceolate, acute or subacute, attenuate to base, pinnately veined beneath, sessile, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{10}$–$\frac{1}{2}$ in. broad. Capitula campanulate, about 20-flowered, $\frac{1}{3}$ in. broad, on slender pedicels $\frac{1}{2}$–1 in. long, in numerous terminal lax cymes. Scales of involucre pluriseriate, linear or linear-lanceolate acute, pubescent, purplish towards the tip, outer smaller. Receptacle alveolate, glabrous. Corolla purple, tubular, scarcely narrowed, sessile-glandular. Anther-base short, obtuse. Achenes 4–5-costate and -angled, callus-based; costæ hispid with ascending setæ, intercostal spaces thinly setulose and sessile-glandular. Pappus duplex, white, outer setæ very short, inner barbellate.—*V. erubescens*, Hochst. in Hb. Schimp. Abyss., 1854, n. 2185; *V. cyanopidea*, Hochst. *l. c.*

Nile Land. Abyssinia, alt. 5500 ft., *Schimper ! Hildebrandt !* Flowers in September.

31. **V. karaguensis,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 91. A coarse, erect, simple herb, about 3 ft. high. Stem terete stout striate covered with short crisp pubescence. Leaves alternate, narrowly elliptical or lanceolate, acute, narrowed at base, subsessile, coarsely papillose-scabrous above, densely and shortly pubescent beneath, serrulate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long by $\frac{1}{8}$–$\frac{3}{8}$ in. wide. Capitula subturbinate, many-flowered, $\frac{1}{4}$ in. wide, subsessile on the divergent branches of terminal corymbose cymes 4–6 in. wide. Scales of the involucre in several series narrowly oblong, subacute, pubescent, purplish above with darker mid-vein and tip; tips of the lower scales recurved. Corolla gradually narrowed, purple. Anther-base acute. Achenes with 5 glabrous ribs and setulose as well as sessile-glandular intercostal spaces, callus-based. Pappus duplex, white; outer very short, inner barbellate, deciduous.

Nile Land. Karaguè (*Vernonia*, sp. n. 10, Speke Journ. App. 637), 5000 ft. alt. Flowers in February, *Speke and Grant !*

32. **V. Burtoni,** *O. & H.* An erect simple pubescent herb, scarcely 1 foot high (?). Stem terete striate. Leaves alternate, upper ascending, narrowly elliptic, acute at both ends, shortly stalked, scabrid-puberulous above, veined beneath and paler, about 1 in. long by $\frac{1}{4}$–$\frac{1}{3}$ in. wide. Capitula campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, many-flowered, mostly on short pedicels, in terminal rather dense cymes 2–3 in. wide. Scales of the involucre multiseriate, linear, acute, outer recurving towards apex, pubescent. Achenes (immature) 5–4-costate, slightly setose, sessile-glandular. Pappus duplex, white, outer very short, inner caducous, barbate.

Lower Guinea. Congo, *Burton!*

33. **V. blumeoides,** *Hook. fil. in Journ. Linn. Soc. Lond.* vii. p. 198. Herbaceous, 2–3 ft. Stem erect simple or but little branched, terete except at apex, striate, shortly and densely tomentose, leafy. Leaves lanceolate, acute, rounded or narrowed at the base, membranous, scabrid especially above, pubescent especially on the veins beneath, subentire, 1–$2\frac{1}{2}$ in. long by $\frac{1}{3}$–$\frac{3}{4}$ in. wide; petioles wide, very short. Capitula about $\frac{1}{3}$ in. wide, about 20-flowered, on unequal pedicels arranged in rather dense corymbose terminal panicles 3–7 in. diameter. Scales of the campanulate involucre multiseriate, 3-nerved, loosely tomentose, shining within, lanceolate to linear apiculate, the outer shorter. Corolla gradually narrowed, purple; segments linear. Anther-base acutely produced, apex linear-lanceolate, acute. Achenes glabrous, acutely 5-angled, with basal callus. Pappus duplex, barbellate, dirty white; outer much shorter. Receptacle narrow, glabrous.

Upper Guinea. Cameroon Mountains, alt. 4–7,000 ft. fl. Nov. Jan., *Mann!*

34. **V. purpurea,** *Sch. Bip. in Hb. Schimp. Abyss.* ii. n. 1197, *Walp. Rep.* ii. p. 946. Rigid, erect herb, $\frac{1}{2}$–4 ft. high, simple or branched above. Stem terete, striate, thinly setulose-scabrid, leafy to the top. Leaves alternate, elliptic-oblong, acute and apiculate, narrowed at base, serrulate, erect-patent or ascending, scabrous, obscurely more or less pellucid-punctate, ranging to 6 in. long, $1\frac{1}{2}$ in. broad; petiole very short. Capitula hemispherical, many-flowered, $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., solitary or in few-headed terminal cymes, surrounded at or near the base with leaf-like bracts equalling or usually much overtopping the involucre. Scales of involucre multiseriate, loosely appressed, from ovate to oblong, narrowed to a rigid acute apiculus, arachnoid-pubescent or tomentose especially when young, purplish at tip, innermost nearly $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. broad, outer shorter and somewhat narrower. Corolla dull purple, sessile-glandular, tube very gradually and slightly dilated above, lobes tipped with short setæ. Anther-bases much produced. Achenes oblong, hirsute or pilose, about 13-costate, callus-based. Pappus pluriseriate, scabrid, sordid or ferruginous, persistent, setæ stiff, outer irregularly shorter.—*V. jaceoides*, Rich. Fl. Abyss. i. p. 376.

Upper Guinea. Nupe, Niger, *Barter!*

Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit!* Woods, Madi, (Speke Journ. App. 137), *Speke and Grant!*

Mozamb. Distr. Mt. Chiradzura, Manganya range (imperfect specimen), *Dr. Meller!*

35. **V. Benthamiana,** *O. & H.* An erect simple or subsimple annual herb, 1½–2 ft. high. Stem rather leafy, terete, striate, with stringy cortical layer, patently pubescent. Leaves alternate, oblanceolate, acute, gradually narrowed towards base, sessile, distantly serrulate-dentate or subentire, scabrous above, white-tomentose beneath, 1–3 in. long, ⅙–½ in. wide. Capitula subglobose, many-flowered, on pedicels ranging to 2 in. long, sometimes subsessile, in elongated or open cymes 2–8 in. wide. Scales of involucre multiseriate; outer rows narrowly linear, setiform, straight, spreading, pubescent below; inner narrowly lanceolate-linear with long recurved apex; innermost truncate and fimbriate at tip, glabrous. Anther-base obtuse. Achenes glabrous, equally and strongly 10-ribbed, terete, slightly narrowed below, callus 0. Pappus conspicuously barbate, uniseriate (?), very caducous.—*Gymnanthemum angustifolium*, Benth. Fl. Nigrit. 429.

Upper Guinea. Sierra Leone, *G. Don! Barter! Afzelius!*

36. **V. Melleri,** *O. & H.* Erect shrub branched at least above; branches ascending, subterete, striate, scabrous above, puberulous lower down. Leaves alternate, oblong or upper ones linear, acute, narrowed to a somewhat dilated clasping and sessile base, remotely denticulate, coarsely scabrous, ranging up to 6 in. long by ⅔ in. wide or more. Capitula hemispherical, many-flowered, 1 in. wide or more, on erect peduncles varying from 1½–4 in. long, in few- or many-headed corymbose or elongate panicles, 3–6 in. wide. Scales of involucre multiseriate, shortly pubescent, scabrous on the margin; outer linear truncate or apiculate; inner narrowly lanceolate acute apiculate, much longer than the outer; tips dark purplish, spreading or recurved. Corolla gradually narrowed; lobes lanceolate-linear, shortly fimbriate at tip. Anther-base acutely produced, -tips deltoid, acute. Achenes 10-costate, shortly and sparsely setulose, especially above, terete, slightly narrowed at both ends, callus-based. Pappus triseriate, conspicuously barbate, rufous; outer shorter.

Mozamb. Distr. Zambesia, Manganja hills, *Dr. Meller!*

37. **V. fastigiata,** *O. & H.* Erect, much branched, from a woody stock, 1–1½ ft. high, branches ascending, at length terete, puberulous and sharply costate above, leafy. Leaves alternate, crowded, linear, pubescent, scabrid, margins revolute, ½–1½ in. long. Capitula campanulate, about ½–⅔ in. diam., solitary at the nearly naked extremities of the erect branches. Scales of the involucre linear or the outer subulate shorter, tapering to a spreading or squarrose bristle-tip, pluriseriate, dark green above without paler midrib, inner matted-tomentose. Receptacle glabrous, alveolate. Corolla gradually narrowed, purple. Anthers shortly pointed at base; apical connective linear-lanceolate. Achenes obscurely about 10-costate, rather softly pilose all over with ascending hairs. Pappus duplex barbellate, outer very short; dirty white.

South Central. Koobie to N. Shaw Valley, *Baines!*; South side of Limpopo River above the waterfall Impopo menē near Peeries Kraal, Nov. 1, 1871, *Baines!*

38. **V. pauciflora,** *Less.; DC. Prodr.* v. p. 61. Annual, erect, 1–4 ft. high. Stem simple or branched, terete, striate, pubescent. Leaves alternate, elongated, acutely attenuate at both ends, serrulate, membranous, puberulous when young, slightly rough to the touch, ranging up to 6 in. long by $\frac{3}{4}$ in. wide, dull yellowish green. Capitula $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, on pedicels up to 3 in. long, in a rather lax terminal forking often leafy cyme, $\frac{1}{2}$–1 ft. long, $\frac{1}{4}$–$\frac{1}{2}$ ft. wide. Scales of the involucre pluriseriate, linear, acute, 1–3-nerved, glandular and softly pubescent, the lower ones filiform at apex, scabrid, and in fruit patent or recurved, darker at tips. Receptacle naked, areolate. Corolla purple, gradually and slightly narrowed, glandular. Anther-base scarcely produced. Achenes covered with erect hairs, obscurely 10-costate, some of the ribs occasionally obsolete, callus-based. Pappus whitish, duplex, barbellate, persistent; outer setæ very short, inner $\frac{1}{4}$ in. long.—*Conyza pauciflora,* Willd. Sp. Pl. iii. 1927. *V. senegalensis,* Desf. non Less. ex DC. l. c. *V. Petitiana,* Rich. Fl. Abyss. i. 373. Conf. *V. Bojeri,* Less; DC. l. c.

Upper Guinea. Niger, *Barter! Baikie!* Dahomey, *Burton!* Senegambia, *Bidjem! Roger!*

North Central. Middle Soudan, *Beurmann,* fide Schweinf. Ber. Beurm. Pfl. in Zeitschr. Allg. Erdk. xv. p. 300 (1863).

Nile Land. Abyssinia, *Schimper!* Sect. iii. n. 1724, *Q. Dillon and Petit! Ehrenberg! Hildebrandt!*; Cordofan, *Kotschy!* Red Sea, Hakeko, *Lord!*

Mozamb. Distr. Bagomojo, *Hildebrandt.*

39. **V. pteropoda,** *O. & H.* Stem herbaceous, subterete or slightly angular, striate, thinly pubescent-tomentose or glabrate, 2–3 ft. Leaves alternate, membranous, ovate or elliptical, acute or finely acuminate, abruptly or gradually attenuate below into the petiole, in the larger leaves acutely unequally incise-dentate or in smaller leaves with short setiform teeth, nearly glabrous or thinly papillose-scabrid above, especially on the reticulation beneath; 5–7 in. long, $1\frac{1}{2}$–4 in. broad; leaves of lateral shoots smaller lanceolate, finely narrowed to each end; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., gradually dilating above. Capitula 12–15-flowered, campanulate, $\frac{1}{3}$ in. diam., on short slender pedicels in terminal and smaller lateral leafy panicles, $\frac{1}{2}$–$\frac{3}{4}$ ft. wide. Scales of involucre pluriseriate, outer ovate or ovate-elliptical, inner oblong or lanceolate, subacute, mucronate, glabrous or nearly so, pale with greenish tips. Receptacle narrow, flat, areolate. Corolla gradually narrowed. Anther-base obtuse. Achenes glabrous or very minutely scabrid, 10-(8)-costate, some of the ribs occasionally lost, callus-based. Pappus white, duplex, scabrous; inner setæ caducous, outer very short.

Mozamb. Distr. Mt. Chiradzura, Manganya Hills (Sept.), *Dr. Meller!*

40. **V. senegalensis,** *Less. in Linnæa,* iv. 265; *non Desf.* Shortly softly tomentose shrub of 10–15 ft.; branches alternate terete striate. Leaves alternate, more or less elliptical, usually narrowed at both ends, broadly pointed or obtuse, nearly glabrous above, tawny-tomentose sometimes subglabrescent beneath, subentire or sinuate, varying to 6 in. long, 3 in. wide, smaller above; petiole up to $1\frac{1}{4}$ in. or more. Capitula $\frac{1}{4}$–$\frac{1}{2}$ in. diam., on pedicels varying to $\frac{3}{4}$ in. long, in terminal divaricate panicles, $\frac{1}{2}$–1 ft. diam. Scales of suburceolate involucre

pluriseriate, coriaceous, appressed in flower, ovate-elliptic to oblong, broadly pointed or apiculate, dark-pointed at apex, nearly glabrous, ciliate, varying to $\frac{1}{6}$ in. in length. Receptacle naked, plano-convex. Corolla gradually narrowed; segments linear-subulate, 'white.' Anther-base acutely produced, -tips linear-lanceolate. Achenes 10-costate, glabrous, with sessile intercostal glands. Pappus ferruginous, uniseriate; setæ subequal, shortly barbellate.—*Eupatorium coloratum*, Willd. Sp. Pl. iii. 1768. *Gymnanthemum cupulare*, Cass. Dict. Sc. Nat. xx. 109. *Baccharis senegalensis*, Pers. Synops. ii. 424, ex Less. l. c. *Conyza rutilans*, Poir. in Lam. Dict. Méth. Suppl. ii. 341 (?). *Chrysocoma amara*, Schum. et Thon. Guin. Pl. p. 383, ex DC. v. 68. *Decaneurum senegalense*, DC. Prodr. l. c. *Conyza radiata*, *C. aurea*, *C. frutescens*, Perr. in DC. l. c. *Gymnanthemum quercifolium*, Steetz in Peters' Mossamb. Bot. 334. *V. quercifolia*, Vatke in Oesterr. Bot. Zeitschr. xxvii. p. 194 (1877).

Upper Guinea. Senegambia, *Michelin! Ingram! Richard, Rousillon;* Niger, *Barter!* (side of streams), Sierra Leone, *Afzelius!*

Lower Guinea. Congo; Loango, *Soyaux!*

Mozamb. Distr. 14–19° S. Lat., *Dr. Kirk!* 16° S. Lat., 35° E. Long., *Meller!* (Native name *Fantsa*) *Dr. Stewart!* Sena and Tette, *Peters!* Zanzibar, *Capt. Burton!*

Lessing describes the immature achenes as pilose.

41. **V. amygdalina,** *Delile Voy. à Méroë*, p. 41. A freely branched shrub of 6–10 ft. high, or a small tree. Branches terete or somewhat angular above, striate, nearly or quite glabrous below, puberulous above. Leaves alternate, lanceolate or lanceolate-oblong, more rarely ovate-elliptical, narrowed at both ends, acute, firmly membranous, serrulate or subentire, puberulous or glabrescent, subsessile or petiolate, 4–6–8 in. long by $2\frac{1}{2}$–3 in. wide; petioles in most forms quite short, in others up to $\frac{1}{2}$–$\frac{3}{4}$ in. long. Capitula about 20-flowered, campanulate, $\frac{1}{8}$–$\frac{1}{4}$ in. wide, on pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. long, in dense much branched globose or pyramidal terminal panicles, 4–12 in. diam. Scales of the involucre pluriseriate, ovate elliptic or oblong, obtuse or subacute, pale green with darker spot near tip, scarcely glabrous or ciliolate; inner ones $\frac{1}{5}$ in. long by $\frac{1}{12}$ in. wide, deciduous. Receptacle glabrous, flat, areolate. Corolla gradually narrowed, white. Anther-tips linear-lanceolate, -base produced. Achenes setulose, obscurely 10-costate, sessile-glandular. Pappus barbellate, sub-uniseriate; setæ equal or some shorter, tawny, or in some specimens rufous.—*Decaneurum amygdalinum*, DC. Prodr. v. 68. *Gymnanthemum amygdalinum*, and *G. abyssinicum*, Schultz Bip. in Walp. Repert. ii. 948. *Cheliusia abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. sect. i. n. 31, 386. *V. adenosticta*, Fenzl ex Walp. Repert. vi. 98. *Bracheilema paniculatum*, Br. in Salt Voy. Abyss. App. iv. p. lxv. (?), name only.

Upper Guinea. (Form usually with longer petioles, *V. Vogeliana*, Benth. in Fl. Nigr. 427) Niger, *Vogel! Barter!* Abbeokuta, *Irving!* 68 (Ewuro, chew-stick), *Kirk!* Fernando Po, *Mann!* 'Mandundudi, Sierra Leone, *Afzelius! Kirk!* (used as a bitter).

Lower Guinea. Annobon Island, *Burton! Curror!* Congo, *Burton!*

Nile Land. Abyssinia, *Schimper! Plowden!* 'Genna,' *Petit! Pullen!* White Nile, *Petherick!* Sennaar, *Kotschy!* Abyssinian name *Grabra.*

42. **V. guineensis,** *Benth. in Hook. Niger Fl.* p. 427. Shrubby. Shoots, young parts and underside of leaves velutinous-tomentose, ferruginous. Branches straight, large, spreading, terete, striate, alternate or rarely opposite. Leaves alternate or occasionally opposite, lanceolate or elongate, acute, narrowed to a subsessile base, serrate, glabrescent above, ranging up to 5 in. long by $1\frac{1}{8}$ in. wide. Capitula campanulate or at length hemispherical, 20–30-flowered, $\frac{1}{3}$–$\frac{2}{3}$ in. wide, on unequal pedicels varying up to $\frac{3}{4}$ in. long, in a lax wide corymbose cyme. Scales of the involucre softly pubescent outside, appressed, dark at the tip, persistent; outer ovate acute; inner oblong, blunt, intermediate narrowly elliptic. Receptacle naked. Corolla gradually narrowed; lobes lanceolate-prolonged, acute. Anthers deltoidly produced at both ends. Pollen globose, echinate. Achenes oblong or subturbinate, slightly or scarcely narrowed downwards, $\frac{1}{10}$ in. long, not callus-based, shortly finely and patently hispid in about 10 series, minutely glandular, terete, about 10-costate. Pappus pluriseriate, rufescent, minutely barbellate, setæ compressed, subdilated; outer series successively shorter, outermost very short, subpaleaceous.

Upper Guinea. Sierra Leone, (fl. blue) *G. Don! Afzelius! Smeathman!*

43. **V. gerberæformis,** *O. & H.* A dwarf acaulescent perennial herb, about 6 in. high, from a thickened woolly rootstock. Leaves radical, oblanceolate, rounded at the apex, attenuate towards the short clasping petiole, repand-denticulate, glabrous, thin, 4–6 by $\frac{2}{3}$–$1\frac{1}{3}$ in. Scapes $\frac{2}{3}$–$1\frac{1}{3}$ in. long, puberulous, bearing one or more narrowly linear acute bracts. Heads solitary, widely campanulate, $\frac{5}{6}$–1 in. long, erect. Involucral bracts lanceolate, acute, puberulous, persistent, loosely appressed in few (about 3) rows, $\frac{1}{2}$–$\frac{5}{6}$ in. long, accompanied at base by some spreading narrowly linear acute bracts like those on the scape. Flowers bluish. Corolla-lobes deep, narrow, varying to 6–7. Achenes shortly hirsute, 10?-costate. Pappus pluriseriate; setæ stiffly barbellate, unequal, subrufous; a few outermost setæ short.

Nile Land. Bongo-land, near Addai, *Schweinfurth!*

44. **V. infundibularis,** *O. & H.* A rigid glabrous herb of several feet. Branches terete, striate, leafy. Leaves linear or linear-oblong, obtuse or somewhat apiculate, coriaceous, narrowed to the subsessile base, 1–$3\frac{1}{2}$ by $\frac{1}{6}$–$\frac{2}{3}$ in., quite entire or very nearly so. Heads turbinate, attenuate below, many-flowered, solitary or few together, on peduncles of $1\frac{1}{2}$–$2\frac{1}{2}$ in., erect, 1–$1\frac{1}{2}$ in. diam. Involucral bracts linear or the outer ones lanceolate, subapiculate, puberulous outside, multiseriate, the innermost nearly 1 in. long, the outer successively shorter, the outermost very small. Flowers bluish violet. Achenes $\frac{3}{8}$ in. long, hairy, about 10-costate. Pappus rufous, multiseriate, about $\frac{1}{2}$ in. long. Receptacle somewhat convex, $\frac{1}{5}$ in. diam.

Nile Land. Niamniam-land, Acker near Kulenscho, *Schweinfurth!*

45. **V. Schweinfurthii,** *O. & H.* Stems several, from a perennial woody stock, erect or ascending, virgate, puberulous below, gla-

brate and angular above, about a foot high. Leaves linear, subsessile, nearly or quite glabrous, subapiculate, narrowed toward the base, green on both sides, $\frac{1}{2}$–2 by $\frac{1}{20}$–$\frac{1}{3}$ in., entire, minutely punctate below. Heads turbinate-hemispherical, $\frac{3}{8}$–$\frac{3}{4}$ in. diam., on rigid peduncles of $\frac{1}{2}$–3 in., solitary or in stiff corymbose cymes. Involucral bracts linear, apiculate, puberulous, the outer ones acute and successively shorter, the outermost ones minute. Flowers reddish violet. Achenes very hairy, 10 ?-costate. Pappus rufous, pluriseriate.

Nile Land. Bongo-land, Djur-land and Mittu-land, *Schweinfurth !*

46. **V. obconica,** *O. & H.* Branches terete, striate, more or less pubescent. Leaves alternate, oval, narrowed at both ends, very shortly petiolate, nearly glabrescent, distantly dentate, $1\frac{1}{2}$–3 in. long by $\frac{1}{2}$–1 in. wide or more, scattered beneath with minute sessile glands. Capitula turbinate, several-flowered, on pedicels about $\frac{1}{3}$–$\frac{2}{3}$ in. long, in dense corymbose many-headed cymes 4–6 in. wide. Scales of involucre puberulous with scabrous margins; the outer ones rigid, erect, subulate, small; the inner ones linear, acute at the very apex, $\frac{2}{5}$ in. long, ultimately spreading. Receptacle narrow. Achenes about 10-costate, columnar, slightly narrowed below, uniformly and shortly hirsute. Pappus 2–4-seriate, barbellate, rufous; setæ unequal, outer shorter.

South Central. Lake Tanganyika, *Cameron !*

Mozamb. Distr. Zanzibar (a fragmentary specimen only), *Capt. Burton !*

Perhaps a variety; without glands on the lower surface of the leaves.

47. **V. glabra,** *Vatke in Oesterr. Bot. Zeitschr.* xxvii. p. 194 (1877). Glabrous herb, probably 2–3 ft. high; stem erect angular above, leafy. Leaves alternate, oblanceolate-oblong, sessile or subsessile, broadly pointed, rounded or obtuse at the base, serrate, membranous, lower 3–4 in. long, 1 in. broad. Capitula turbinate $\frac{1}{3}$–$\frac{3}{4}$ in. diameter on unequal slender pedicels varying to $\frac{3}{4}$ in., in terminal corymbose panicles $\frac{1}{2}$–1 ft. diameter. Bracts minute acute. Scales of involucre very unequal, pluriseriate, rather loosely appressed, linear-lanceolate, acute, sub-1-nerved, minutely ciliolate with ascending setæ, lower scales minute, glandular-puberulous above. Receptacle glabrous, flat, areolate. Corolla gradually narrowed, purple. Anther-base produced. Achenes hirsute, multi- (10-)costate, callus-based. Pappus reddish-brown, barbellate, rigid, pluriseriate; setæ unequal, outer somewhat shorter.—*Linzia glabra,* Steetz in Peters Mossamb. Bot. 353.

South Central? Lat. 23°, *Chapman and Baines !*

Mozamb. Distr. Zambesi and Shire, *Drs. Kirk and Meller !* fl. and fr. in January; Shupanga, *Dr. Stewart !* Sena, *Peters !*

48. **V. inulæfolia,** *Steud.*; *Rich. Fl. Abyss.* i. 375. Stem branched at base, erect, terete and nearly simple above, scabrous, striate, 1–2 ft. high, closely leafy. Leaves alternate, erect, ovate or lanceolate above, acute or shortly acuminate, rounded or narrowed at base, submembranous, often remotely serrulate, 1–4 in. long by $\frac{1}{3}$–$1\frac{1}{2}$ in. wide, petioles dilated and somewhat clasping at the base, about $\frac{1}{10}$ in. long, pubescent. Capitula $\frac{1}{2}$–$\frac{2}{3}$ in. diameter, many-flowered, on short scabrid pedicels,

in dense small terminal corymbs $1\frac{1}{2}$–3 in. diameter. Scales of the campanulate involucre lanceolate or linear-oblong, apiculate, woolly outside, glabrous inside, in many rows, inner longer, apex and apiculus dark, yellowish beneath, innermost purplish at the tip about equalling the pappus. Corolla gradually narrowed, glabrous. Anthers shortly obtusely produced at base. Achenes densely setose-hirsute with erect bristles, 10-ribbed; callus prominent. Pappus duplex persistent scabrous faintly reddish brown, outer the shorter; subconfluent at the base.—*V. Schimperi*, Schultz Bip. in Hb. Schimp. Abyss. i. n. 221, non DC.

Nile Land. Abyssinia, *Schimper!* Djur-land (flowers reddish violet), *Schweinfurth!*

49. **V. Hochstetteri,** *Schultz Bip.; Walp. Repert.* ii. p. 945. Shrubby, 2 ft. or more high. Branches terete, slightly striate, shortly and closely tawny-tomentose. Leaves alternate, submembranous, ovate-lanceolate or lanceolate, acutely acuminate, cuneately narrowed into the petiole, serrulate, upper surface scabrid, lower pubescent-tomentose, ranging to 5 in. long by $1\frac{3}{4}$ in. wide; petioles ranging to $\frac{1}{2}$ in., pubescent-tomentose, somewhat dilated and clasping at base. Capitula $\frac{1}{2}$ in. diameter, many-flowered, on pubescent-tomentose pedicels 0–$\frac{1}{3}$ in. long, in rather dense terminal corymbs 2–10 in. diam. Bracts on the pedicels small. Scales of the campanulate involucre lanceolate or linear-lanceolate, apiculate, pubescent and purplish outside, glabrous inside, margins scarious, outer $\frac{1}{10}$, inner $\frac{5}{16}$ in. long. Receptacle naked. Corolla gradually narrowed, puberulous. Anther-base shortly obtusely produced. Achenes strongly (9-) 10-striate, hispid. Pappus duplex, barbellate, pale reddish brown; inner deciduous; outer much shorter.—Rich. Fl. Abyss. i. 373; *Ambassa Hochstetteri*, Steetz in Peters Mossamb. Bot. 364; *Vernonia Köstlini*, Hochst. in Rich. l.c.

Nile Land. Abyssinia, *Schimper* Local name *Schugualé! ambassa.*

50. **V. Quartiniana,** *Rich. Fl. Abyss.* i. p. 379. Shrubby, branched at base from a short woody stock densely tomentose at the nodes; stem erect simple above or nearly so, $1\frac{1}{2}$–3 ft. high, terete, striate, softly pubescent or pulverulent, densely leafy above. Leaves alternate erect elliptic or the longer ones lanceolate, blunt or shortly apiculate or the younger ones acute, more or less narrowed at base, smooth, pulverulent when young, usually serrate; subcoriaceous, 1–$3\frac{1}{2}$ in. long by $\frac{1}{4}$–$1\frac{1}{4}$ in. wide; petioles stout, about $\frac{1}{10}$ in. long. Capitula $\frac{1}{2}$–$1\frac{1}{4}$ in. diameter, many-flowered on short pedicels arranged in many-headed terminal usually pyramidal or elongated oblong panicles. Scales of the turbinate involucre in many rows, linear, white-woolly outside inner longer, mostly with dark purplish reflexed tips. Receptacle narrow, naked. Corolla gradually narrowed, somewhat woolly at top of tube. Anther-base shortly-produced. Achenes with 10 or more (15) equal longitudinal ribs, densely and subappressedly hirsute; callus prominent. Pappus pluriseriate barbellate persistent, rather exceeding the invo-

lucre, brown, the outer ones the shorter.—*Linzia vernonioides*, Schultz Bip. in Hb. Schimp. Abyss. sect. i. n. 5 et iii. n. 1995.

Nile Land. Abyssinia, *Schimper! Pullen! Parkyns! Plowden!*

51. **V. nigritiana,** *O. & H.* Stem erect, woody, 1–2¼ ft. high, simple or branched above; stem terete, slightly sulcate, scabrid. Leaves alternate, oblong or elliptic, subcoriaceous, very scabrous on both sides, acute or broadly pointed, cuneately narrowed at base into short petiole, rather distantly serrulate, 3–7 in. long by 1–3 in. wide, but the upper ones smaller, passing into bracts. Capitula 1½–3 in. diameter, many-flowered, on bracteate scabrid peduncles ¼–2½ in. long, arranged in few or several-headed terminal corymbs, rarely solitary. Scales of the involucre lax linear scabrid, in many rows, outer continuous with the upper bracts of the pedicel, inner elongate-linear, about twice exceeding the pappus, spreading, tips recurved linear-spathulate, crimson inside. Receptacle narrow, areolate, glabrous. Corolla gradually narrowed, glabrous. Anther-base shortly and acutely produced. Achenes 10-nerved, densely hispid with erect setæ. Pappus ∞-seriate, scabrid, persistent, red-brown, rigid; outer setæ short, inner successively longer.

Upper Guinea. Niger, *Barter!* Abbeokuta, *Irving!*

52. **V. filigera,** *O. & H.* Stem herbaceous, stout, erect, densely leafy, terete, striate, minutely ashen-tomentose. Leaves alternate, petiolate, membranous, ovate-oblong -elliptical or lanceolate, acute base narrowed into the petiole, unequally acutely dentate serrate, nearly glabrous above, paler and thinly tomentose or at length glabrate beneath, 3–6 in. long, 1½–2½ in. broad; petiole 1 in. or less, dilated at base. Capitula hemispherical, about ½ in. diameter, on short unequal pedicels, in corymbose terminal panicles ½ ft. wide more or less. Scales of involucre multiseriate, outer herbaceous, linear-subulate, inner oblong or lanceolate, all finely attenuate at apex, terminating in a long filiform tail, loose patent or inner at length recurved, pubescent-tomentose externally. Receptacle flat, areolate, glabrous. Corolla-tube slightly but distinctly dilated above. Anther-tips lanceolate, base shortly and obtusely produced. Achenes 10-ribbed, not setulose, with glandular-papillose intervals, callus-based. Pappus uniseriate barbellate tawny caducous.—*V. hymenolepis*, Vatke in Linnæa xxxix. p. 477 (1875), non Rich.

Nile Land. Abyssinia, 5–10 ft. high; by banks of rivulets at Gaffat, alt. 8100–8200 ft., 10th December, 1863, and Gondar, alt. 6800 ft., 6th November, 1863, *Schimper!*

53. **V. abyssinica,** *Sch. Bip. in Hb. Schimp. Abyss.* sect. i. n. 389. Stem erect, branched, terete, conspicuously striate, softly puberulous, early glabrate, 1½–2 ft. high. Leaves alternate membranous, lanceolate or narrowly elliptical, acute at both ends, serrate, glabrous or glabrescent, varying up to 2 in. long, ½ in. broad, subsessile. Capitula campanulate, ½–¾ in. diameter, on pedicels varying to 1 in. in length, in terminal corymbose panicles. Scales of involucre pluriseriate oval-

oblong, outer much shorter, lanceolate, narrowed rather abruptly into a lanceolate appendix, yellowish, obscurely 5–7-nerved, glabrous; outer herbaceous-tipped, tips ultimately spreading. Receptacle glabrous. Corolla gradually narrowed, glabrous, slender below. Anther-base acutely produced. Achenes 20-striate, pubescent with ascending hairs. Pappus 3–4-seriate, reddish-brown, shining, barbellate; outer setæ shorter.—Walp. Rep. ii. 947; *Stengelia controversa*, Sch. Bip. ex Walp. l.c. (*Teichostemma fruticosum*, R. Br. Salt, App. 65); *V. polymorpha*, Vatke in Linnæa xxxix. p. 476 (1875), var. *microcephala*, Vatke l.c., p. 477.

Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit;* Tigre-name, *Zāda-Kurna, Ferret and Galinier* (with whitish pappus and less dentate leaves).

754. **V. Kotschyana,** *Sch. Bip. ex Walp. Rep.* ii. p. 947. Stem erect terete striate puberulous glabrescent, probably several feet in height. Leaves oblong-elliptical or oblong-lanceolate, acute, serrate or denticulate, narrowed into petiole, glabrous or sparsely papillose-scabrid above, nearly glabrous or obsoletely tomentose beneath, 3–6 in. long on flowering branches $\frac{3}{4}$–$2\frac{1}{2}$ in. broad, sessile or petiole varying to $\frac{1}{2}$ in. Capitula $1\frac{1}{2}$–2 in. diameter, on puberulous peduncles $\frac{1}{2}$–2 in. long, in lax terminal somewhat forking cymes; scales lax erect puberulous or glabrate wavy linear-lanceolate acuminate, the outer continuous from and consolidated with the turbinate dilated base of the receptacle, the intermediate slightly constricted near the base, 1 in. long, more or less, innermost linear with terminal appendix; receptacle concave, naked. Corolla gradually narrowed into a long slender tube. Achenes equally 20-striate, shortly pilose with ascending hairs; setæ 3–4-seriate, finely pointed barbate.—*V. polymorpha*, Vatke in Linnæa, xxxix. p. 477, β. *ambigua*, Vatke l.c. (1875); *Stengelia Kotschyana*, Hochst. in Hb. Kotsch. Nub. n. 290; *Ascaricida Kotschyana*, Steetz in Peters Mossamb. Bot. 359, adnot.

Nile Land. *Petherick!* Sennaar and Cordofan, *Kotschy!* Abyssinia, *Schimper! V. Kotschyi*, Schultz. Bip., ex Schweinf. Fl. Æthiop. p. 287, n. 2654 is probably meant for the above species.

Var. *latifolia*. Heads few together; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. long, not thickened at the apex. Receptacle somewhat convex, $\frac{2}{3}$ in. diameter. Leaves oval, ranging up to 10 by 4 in., narrowed at the base into the short petiole, serrate-dentate, membranous, glabrous above, thinly pubescent or obsoletely tomentose beneath. Pappus rufous. Achenes the same as in the species.

Nile Land. Bongo-land, *Schweinfurth!* on rocks near Addai.

55. **V. Buchingeri,** *Sch. Bip. ex Steetz in Peters Mossamb. Bot.* p. 359, *adnot.* Stem erect $1\frac{1}{2}$ ft. from a woody stock, sulcate with thinly scattered pubescence, glabrate. Leaves sessile, almost concealing the stem, oblong-lanceolate, acute, denticulate-serrate with thinly scattered minute crisped hairs on both sides. Capitula resembling those of *V. Kotschyana* in size, in few-headed terminal cymes; appendix of median scales ovate-lanceolate subacute (not acuminate) glabrous or nearly so. Corolla-tube gradually narrowed. Achenes probably as in

V. Kotschyana; setæ rather dilated towards the apex, obtuse, barbate. —*Ascaricida Buchingeri*, Steetz, l.c.

Nile Land. Abyssinia, *Schimper!* (1853, No. 386.)

56. **V. firma,** *O. & H.* Branches softly tomentellous, sulcate. Leaves elliptical, narrowed at both ends especially towards base, serrate-dentate, thinly coriaceous, green and glabrous above, soft and smooth beneath with an obsolete tomentum, pale, tinged with red, shortly petiolate, 2–5 by 1–2 in. Heads campanulate, many- (40–50)-flowered, $\frac{2}{5}$–$\frac{3}{5}$ in. diameter, on rigid pedicels of $\frac{1}{2}$–$2\frac{1}{2}$ in., in a stiff corymbose cyme leafy below of 6 in. diameter. Involucral bracts oblong or linear or the outermost lanceolate, puberulous on exposed parts, coriaceous, with a short mostly obtuse membranous apical appendage; innermost nearly $\frac{1}{2}$ in. long. Corolla rose-blue, nearly $\frac{1}{2}$ in. long. Achenes $\frac{1}{10}$ in. long, closely setulose, 10-costate. Pappus slightly reddish, $\frac{3}{8}$ in. long. Receptacle nearly flat.

Nile Land. Niamniam-land, *Schweinfurth!*

57. **V. tigrensis,** *O. & H.* A shrub ranging up to 6–7 ft. high. Branches terete, striate, minutely hoary at length nearly glabrous. Leaves oblong-lanceolate, subacute, narrowed below into the petiole, serrate or serrate-dentate, puberulous-scabrid above, tomentose beneath, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long on flowering shoot, $\frac{3}{4}$–1 in. broad; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. Capitula $1\frac{1}{4}$ in. diameter, on puberulous peduncles of $\frac{1}{4}$–$1\frac{1}{2}$ in. in terminal corymbose cymes $\frac{1}{2}$ ft. diameter; scales puberulous or inner glabrous below, ascending; intermediate linear-oblong with an oblong- or linear-lanceolate subacute appendix separated by but a slight constriction, innermost scales linear acute; receptacle naked. Corolla not seen (violet-coloured, *fide* Vatke). Achenes 20-striate, 10 red alternating with 10 nearly black striæ, shortly hirsute with ascending tawny hairs; setæ scabrous, outer very short.—*V. polymorpha*, Vatke in Linnæa xxxix. p. 476 (1875), var. γ. *accedens* et ? var. β. *ambigua*, Vatke l.c. p. 477.

Nile Land. Abyssinia, *Schimper!* 1862, n. 817; *Hildebrandt!*

58. **V. Tenoreana,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 92. Attaining 6–7 ft., branches sulcate, tomentose at first, at length crisped-puberulous. Leaves oblong-lanceolate, acute, serrate, or dentate-serrate with gland-mucronate teeth, narrowed into the petiole, scabrid-puberulous above, tomentose beneath, 5–7 in. long, $1\frac{1}{2}$–2 in. broad; petiole winged nearly to the base. Capitula $1\frac{1}{2}$ in. in expansion, on peduncles $\frac{1}{4}$–$\frac{3}{4}$ in., in terminal irregular cymes of 3–5, sometimes over-topped by lateral leafy branches; involucre and peduncle tomentose; bracts ascending or appressed, appendix of intermediate bracts ovate-lanceolate acute or apiculate, with a more or less distinct midrib; receptacle naked. Limb of corolla gradually narrowed into tube. Anther-tails shortly produced, contiguous connate, together obtuse. Achenes subequally 20-striate, striæ often faint, shortly hispid with ascending tawny hairs; setæ very slightly dilated towards apex,

barbed.—*Candidea senegalensis*, Ten. in Atti del R. Acc. Sc. Nap. iv. p. 105, t. 1, 2.

Upper Guinea. Abo, Nigritania, *Barter!*; Senegal.

Too near to this to justify specific separation is a plant of which we have a fragment collected by Colonel Grant at Karagué, 1° 42′ S. Lat. near the Victoria N'yanza.

59. **V. Grantii,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 92, t. 57. Branches finely sulcate early glabrescent. Leaves oblong-lanceolate subacute, irregularly serrate or nearly entire, scabrid or minutely hispid above, at first tomentose, at length glabrous beneath, 4–6 in. long, 1½–2 in. broad, narrowed to a petiole of ½–1 in. Capitula 1½ in. diameter, on peduncles ¼–¾ in., in terminal cymes of about 4, hoary-tomentose; intermediate bracts with an ovate acuminate appendix and distinct median nerve. Corolla not seen. Achenes 20-striate, striæ often faint, shortly hispid with ascending tawny hairs. Setæ wholly free, finely pointed, scabrous.

Nile Land. Unyoro, Upper Nile, *Speke and Grant!*

Closely allied to *V. Tenoreana*, differing in the more distinct petiole, less serrate leaves at length glabrous beneath, less acuminate involucral scales and more finely pointed pappus-setæ.

60. **V. adoënsis,** *Sch. Bip. ex Walp. Rep.* ii. p. 946. Upper portion of erect stem terete, sulcate-striate, puberulous or minutely tomentose. Leaves petiolate, oblong- or ovate-lanceolate, acute, unequally or denticulate-serrate, scabrid or minutely hispid above, closely tomentose beneath, 3–5 in. long, on petioles of ¼–½ in. more or less. Capitula 1–2 in. diam., pedunculate, in terminal few- or many-headed lax corymbose cymes; bracts spreading or recurved, puberulous or minutely tomentose, appendix of intermediate bracts oblong-ovate or elliptical, obtuse or broadly pointed, often mucronulate; inner bracts nearly or quite equalling the pappus. Corolla gradually narrowed into the long tube. Achenes nearly equally 20-striate, tawny-silky; pappus ∞-seriate, scabrous, subattenuate above.—*Stengelia adoënsis*, Sch. Bip. in Hb. Schimp. Abyss. i. n. 318; *Ascaricida adoënsis*, Steetz in Peters Mossam. Bot. 358, adnot; *V macrocephala*, Rich Fl. Abyss. i. 377, t. 57 (non Lessing); *Ascaricida Richardi*, Steetz in Peters, l. c.; *V. polymorpha*, Vatke in Linnæa, xxxix, p. 467 (1875), var. *a. adoënsis*, Vatke, *l. c.*

Nile Land. Abyssinia, *Schimper! Pullen! Q. Dillon and Petit!*

We have identified *V. macrocephala*, Rich, after comparison, with the solitary imperfect specimen in the Richard Herbarium in the possession of Count Franqueville, to whose ready courtesy we are greatly indebted for the opportunity of examining M. Richard's types. The receptacle becomes at length, at least in some cases, distinctly concave, as in *V. Kotschyana*. Dr. F. W. Klatt, in Ann. Sc. Nat. Ser. v. vol. xviii. p. 363, identifies specimens from Senegal, collected by Bidjem and Thierry (No. 87) with *V. macrocephala*, A. Rich.

61. **V. shirensis,** *O. & H.* Stem and leaves of *V. adoënsis*, the close tomentum on the under surface of the latter faintly reddish-brown when dry, leaf-base rounded below and narrowly produced into the petiole. Capitula 1–1¼ in. diam., solitary or few in the forks or at the extremities; bracts scarcely equalling the pappus, tomentose externally,

appendix ovate or ovate-rotundate, apiculate, recurved. Corolla gradually narrowed below. Achenes as in *V. adoënsis*.

Mozamb. Distr. Shire valley, Zambesi-land, *Dr. Meller!*

Dr. Kirk collected on the Manganya Hills, bounding the Shire valley a *Vernonia*, agreeing with the foregoing, excepting in the coarser dentate-serrature of the leaves, and the much larger ovate-acuminate recurved appendix of the intermediate involucral bracts, that of the outer being more or less conduplicate. It may be a distinct species. We should have taken it for *V. mossambiquensis* (Steetz), were it not for the gradually narrowed corolla and distinct petioles.

62. **V. mossambiquensis,** *O. & H.* Branches terete, striate, hoary-pubescent at first, at length glabrate. Leaves elliptic-oblong, acute, narrowed into short petiole, acutely serrate or upper denticulate or subentire, thinly hairy strigillose or scabrid above, closely hoary-tomentose beneath, 3–6 in. long; lower petioles $\frac{1}{2}$ in., upper $1\frac{1}{2}$–$\frac{1}{6}$ in. Capitula 1 in. diam., usually 2–3-nate, leaf-opposed, shortly pedunculate, with a subtending leafy bract; appendix of median scales lanceolate, acute, undulate, squarrose. Corolla-tube very slender, abruptly dilated into campanulate limb (*fide* Steetz). Achenes cylindrical, 10-costate, hirsute, with long blackish hairs; callus large; setæ ferruginous, slender, shining, outer shorter.—*Ascaricida mossambiquensis*, Steetz in Peters Mossamb. Bot. 358. *V. polymorpha*, Vatke, *a. adoënsis*, ex Vatke in Oesterr. Bot. Zeitschr. xxvii. p. 194 (1877).

Mozamb. Distr. Boror and Rios de Sena, *Dr. Peters!*

63. **V. pumila,** *Kotschy et Peyr. Pl. Tinn.* p. 37, t. 17 A. Low herb of 2–4 in., from a persistent woody stock; branches erect, 1–5-headed, striate, sparsely hoary-tomentose, with a few alternate linear or lanceolate acute denticulate sessile leaves or bracts $\frac{1}{4}$–$\frac{1}{2}$ in. long, more or less tomentose, at least on under side. Heads 1–$1\frac{1}{2}$ in. diam., hemispherical, on peduncles of $\frac{1}{2}$–2 in., solitary or cymose; scales 3–5-seriate, erect, more or less tomentose dorsally, oblong-lanceolate, rather obtuse, apical appendix very obscure and short or obsolete. Corolla-tube slightly dilated above. Achenes 10-costate, setulose. Pappus ∞-seriate, outer slender, very short, inner setaceous; setæ slightly dilated or linear-spathulate towards apex, rigid, shining, barbellate.

Upper Guinea. Rio Nunez, *Jardin!*

Nile Land. Madi, in woods, uncommon, Dec. *Speke and Grant!* Dry places amongst rocks, with both white and violet flowers, at Bongo, *Heuglin*.

No doubt the ordinary leaves of the plant are yet to be described. Neither in Heuglin's plant (figured above), nor in Col. Grant's, nor M. Jardin's, are any given off from the stock.

64. **V. insignis,** *Hook. f. in Journ. Linn. Soc.* vii. p. 199 (*Stengelia.*) Attaining 10–15 ft.; branches terete, sulcate-striate, puberulous-tomentose above. Leaves oblong-lanceolate, acuminate, narrowed below to a minutely auricled base, on distinct slender petioles $\frac{1}{3}$–$\frac{3}{4}$ in. long, acutely denticulate-serrate, with few scattered minute hairs or glabrous, 4–6 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad. Capitula $1\frac{1}{2}$–2 in. diam., glabrate, on peduncles varying to 2 in.; bracts ample, base broadly imbricating, appendix of intermediate broadly ovate, obtuse or apiculate, $\frac{1}{3}$ to nearly

½ in. broad. Receptacle naked. Corolla rather abruptly narrowed into long slender tube. Achenes glabrous, subequally 20-costate; setæ very long, finely tapering, distinct to base.

Upper Guinea. Cameroon Mountains, 3–7000 ft., *Mann!*

65. **V. Calvoana,** *Hook. f. in Journ. Linn. Soc.* vii. p. 199 (*Stengelia*). Shrub of 8–12 ft.; extremities sulcate-striate, minutely tawny-tomentose. Leaves ample, membranous, oblanceolate or narrow-elliptical acuminate, narrowed below into a winged petiole, often auricled at base, denticulate, minutely pubescent on the nerves beneath, ½–1¼ ft. long. Capitula 2 in. diam., florets purple, on peduncles varying to 3–4 in. in diffuse terminal cymose panicles; involucre nearly glabrous, intermediate scales with an elliptic-ovate rather obtuse spreading white appendix, ¾ in. long, from the concave closely appressed imbricating base. Corolla-tube abruptly narrowed. Achenes black, glabrous, with 10 prominent costæ, alternating with 10 narrower.—Bot. Mag. 5698.

Upper Guinea. Cameroon Mountains, 2500–7000 ft., *Mann!*

66. **V. Rothii,** *O. & H.* Near to *V. adoënsis.* Stem clothed with pale compact tomentum, attaining 6 ft. Upper leaves rather coriaceous, ovate-lancolate, acute, narrowly produced at base into the petiole, denticulate-serrulate, closely tomentose beneath, early glabrescent above or midrib hoary, 2½–4 in. long. Capitula ¾–1 in. diam., on peduncles of 1 in. or less, often numerous in dense terminal corymbose cymes; bracts ascending, nearly glabrous, outer lax, linear to lanceolate, the lower inserted on peduncle; appendix of intermediate bracts ovate-lanceolate, acute, submembranous, scarcely exceeding the pappus. Receptacle naked. Corolla rather abruptly narrowed into slender tube. Achenes glabrous or with very few scattered hairs, 20-striate, intermediate fainter; setæ scarcely dilated above.

Nile Land. Ankober, Abyssinia, *Roth!*

67. **V. hymenolepis,** *Rich. Fl. Abyss.* i. p. 378, *non Vatke.* Stem and leaves as in *V. Rothii.* Capitula 1–1½ in. diam. on peduncles varying to 1 in. or subsessile, in terminal rather compact cymes; involucre nearly glabrous or outer bracts tomentose; outer bracts and appendix of intermediate ones elongate-linear, acuminate, overtopping the pappus. Receptacle naked. Achenes subpolygonal, glabrous, 10-ridged (or with intermediate narrower ridges when mature), minutely scabrid-tubercled; setæ scarcely dilated above.

Nile Land. Abyssinia, *Petit!* Ankober, *Roth!*

68. **V. cylindrica,** *Sch. Bip. ex Walp. Rep.* ii. p. 945 (*ex descr.*), *non Rich.* Shrubby, stem erect, leafy, 2 ft. or more, subterete, puberulous, glabrescent. Leaves alternate, ovate, obtuse or broadly pointed, base rounded, decurrent on the short petiole, minutely serrate, coriaceous, scabrid, yellowish-green when dry, 4–5 in. long, 3 in. broad, or upwards. Capitula oblong-campanulate, terete, ⅓–½ in. diam., on pedicels varying to 1 in., cymose, in rather lax corymbiform terminal panicles ½–1 ft. diam. Scales of involucre multiseriate, closely appressed, coriaceous, shining, nearly glabrous, purplish, obtuse, outer ovate much

shorter, inner oblong or oblanceolate. Corolla gradually narrowed, glabrous. Anther-base obtuse. Achenes acutely 5- (6-)angled, minutely glandular, glabrous, callus-based. Pappus white, scarcely exceeding the involucre, duplex, outer setæ very short, inner scabrous. —*Webbia serratuloides*, Sch. Bip. mss. in Hb. Kew.

Nile Land. Abyssinia, *Schimper! Plowden!*

69. **V. frondosa,** *O. & H.* Stem woody, unbranched, 10–20 ft., leafy, terete, striate, closely tawny-tomentose above. Leaves very large, alternate, membranous, tomentose and paler beneath, dark glabrate and obsolete-scabrid above; upper obovate-elliptical, broadly pointed, base narrowed into the short amplexicaul petiole, broadly toothed and denticulate, $1\frac{3}{4}$–$2\frac{1}{2}$ ft. long, 7–12 in. broad. Capitula many-flowered (yellowish, *Barter*), $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, sessile on the ascending branches of an ample terminal pyramidal panicle, 1–3 ft. long; bracts 1 in. more or less, lanceolate, tomentose. Involucre campanulate; scales multiseriate, appressed, acute, more or less tomentose, outer ovate, inner much longer, linear, caducous. Receptacle areolate, glabrous. Achenes glabrous, unequally (9-) 10-costate. Pappus white, pilose; setæ subequal, at length widely spreading.

Upper Guinea. Eppah, Nigritania, *Barter!*

70. **V. conferta,** *Benth. Fl. Nigrit.* p. 427. Tree of 20–25 ft., with stout terete tomentose leafy branches, striate above. Leaves alternate, obovate- or elliptic-oblong, acute or broadly pointed, narrowed into the petiole, membranous, sinuous or lobulate and remotely denticulate, paler and shortly and thinly tomentose beneath, 1–3 ft. long, $3\frac{1}{2}$–9 in. broad; petiole 1–3 in., tomentose, dilated and amplexicaul at base. Capitula 10–18-flowered, at first oblong from a campanulate base, $\frac{1}{3}$ in. long, shortly pedicellate or subsessile, in spiciform racemes arranged in ample terminal panicles. Scales of involucre pubescent or thinly pilose above, multiseriate, outer smaller, ovate, obtuse, divergent, inner linear, acute, $\frac{1}{4}$ in. long, early caducous. Receptacle areolate, glabrous. Corolla greenish-white, gradually narrowed, minutely sessile-glandular above. Anther-base produced, tips lanceolate. Achenes about 10-costate, glabrous, callus-based. Pappus uniseriate, subequal, scabrid.

Upper Guinea. Sierra Leone, *G. Don!* Fernando Po, *Mann!*
Lower Guinea. Congo, *Chr. Smith!*

71. **V. theophrastifolia,** *Schweinf. mss. in herb.* A tree? of 15 ft. Branchlets angular, striate, with short pale inconspicuous pubescence. Upper leaves oblanceolate, obtuse, membranous, denticulate with narrow acute teeth terminating the slender nervules, acuminate towards the sessile auriculate amplexicaul base, somewhat scurfy above, puberulous beneath, $13\frac{1}{2}$ by $3\frac{1}{2}$ in. Inflorescence divaricately flowered, nigro-subrugose. Heads sessile or subsessile, about 8-flowered, clustered 4–1 together, campanulate, $\frac{1}{4}$ in. long. Involucral scales pluriseriate, coriaceous, glabrous; inner ones oval apiculate caducous, outer ones successively shorter, ovate or suborbicular, obtuse. Recep-

tacle narrow, glabrous. Achenes apparently glabrous. Pappus uniseriate, dense, scabrid, equal, subsordid, in bud not exceeding the involucre.

Nile Land. Niamniam-land, Nahambosso, *Schweinfurth!*

72. **V. Doniana,** *DC. Prodr.* v. p. 23. Shrub of 6 ft.; branches terete, rusty-tomentose as well as the underside of leaf-midrib petioles and peduncles. Leaves elliptical, more or less acute at both ends, entire, glabrous except midrib, uppermost 4 in. long, 1¼–1½ in. on petiole of ⅓–½ in. Capitula about 10-flowered, campanulate-turbinate, ¼ in. diam., on pedicels equalling the involucre or subsessile in pedunculate racemes or dense few-headed clusters arranged alternately along the branches of the ample terminal panicle; bracts oblong or lanceolate, ⅛–¼ in. long. Scales of the involucre pluriseriate, from ovate to ovate-oblong, nearly glabrous, brown, darker towards tip; inner ones caducous, broadly pointed, divergent. Receptacle narrow flat glabrous. Corolla gradually narrowed; lobes linear-lanceolate. Anther-base rather obtuse, apex lanceolate, acute. Achenes 4–5-angled, with obscure intermediate ribs, glabrous. Pappus subscabrid, with few irregularly shorter setæ, pale tawny colour or white.—*Eupatorium paniculatum*, Lindl. in Hb.! nec auct. alior.

Upper Guinea. Sierra Leone, Leinster Mount, *Miss Turner! G. Don!*

73. **V. Thomsoniana,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 91. Shrub; branches sulcate, obscurely angular and puberulous above. Leaves alternate, submembranous, elliptic-oblong, acute, attenuate at base into the narrowly winged petiole, obsolete-serrulate, glabrous or obscurely sessile-glandular, puberulous beneath, 3–4 in. long, 1–1¼ in. broad. Capitula campanulate-oblong, ⅙ in. diam., on slender unequal usually very short puberulous pedicels, closely crowded in corymbose terminal panicles, ½ ft. wide. Scales of involucre multiseriate; outer smaller, ovate; inner obovate-oblong, caducous, obtuse, erose or denticulate, pale-yellowish green, nearly glabrous. Receptacle naked. Corolla gradually narrowed. Anther-base acutely produced. Achenes (immature) not setulose, with 5 distinct ribs (and a few obscure ones?), intervals with scattered minute sessile glands; callus-based. Pappus uniseriate, scabrid, white.—*V. Vogeliana*, Thoms. in Speke et Grant, Journ. App. 637 (non Benth.)

Nile Land. Madi, fl. Dec. (Salt-bush), *Speke and Grant!* Mittu-land, *Schweinfurth!* (large shrub).

74. **V. Livingstoniana,** *O. & H.* Erect perennial herb, 3–4 ft. high, somewhat shrubby below. Stem simple, terete, striate, straight, puberulous, naked below, leafy above. Leaves alternate, ovate or ovate-lanceolate, acute, narrowed at base, denticulate or subentire, puberulous or nearly glabrous above, shortly and closely pubescent-tomentose beneath, ranging up to 3 in. long by 1¼ in. wide; petioles up to ½ in. long, hairy. Capitula campanulate-oblong, about 6-flowered, ⅛ in. wide, on short pedicels, crowded in globose or corymbose clusters terminating the upper branches and arranged in a terminal leafy

panicle. Scales of the involucre pluriseriate, lax; outer ovate; inner narrowly elliptical, blunt or subapiculate, nearly glabrous, but puberulous or ciliate towards tip, inner caducous. Receptacle narrow, glabrous. Corolla gradually narrowed. Anther-base produced. Achenes 4–6-sided, glabrous, sessile-glandular. Pappus brittle and caducous, biseriate, barbellate, white; outer setæ shorter, exceedingly caducous, perhaps sometimes altogether wanting.

Mozamb. Distr. Manganja Hills, *Meller!* Shire, *Dr. Stewart!*

75. **V. myriocephala,** *Rich. Fl. Abyss:* i. p. 374. Shrubby; shoots terete, striate, glabrate, puberulous at extremities. Leaves (upper) narrowly oblong or elliptical, acute, sessile, auriculate at the base, membranous, glabrous above, pale-tomentose below, 1–3½ in. long by ¼–½ in. broad. Capitula turbinate-campanulate, about 10-flowered, ⅓–½ in. long, subsessile in small clusters on the divaricate scorpioid branches of dichotomous terminal panicles 5 in. wide. Scales of involucre pluriseriate, elliptical, subglabrate, obtuse, mucronulate; inner deciduous. Corolla gradually narrowed, glabrous. Anther-base short. Achenes densely setulose, 10-costate, costæ concealed by hairs. Pappus biseriate, sordid, setiform, scabrous; outer setæ shorter.

Nile Land. Abyssinia, Gondar, *Q. Dillon and Petit*

76. **V. podocoma,** *Schultz Bip.*; *Schweinf. et Asch. Enum.*, p. 287. Shrub of 2–3 ft. or more; branches terete, striate; extremities and leaves beneath hoary-tomentose. Leaves alternate, narrow-elliptic or ovate-elliptic, acute, narrowed to an obtuse or subcordate-base, denticulate-serrate, puberulous, glabrescent above; upper 2–5 in. long, 1–2 in. broad; petiole ½–1 in., tomentose. Capitula few-(4–5-) flowered, ¼ in. long, sessile or subsessile, in dense spreading terminal and axillary tomentose panicles, ½–1 ft. broad. Scales of involucre pluriseriate, glabrate or puberulous above, outer smaller, ovate-rotundate, inner at length divergent, caducous, elliptic-oblong, obtuse, mucronate or muticous, darker above. Receptacle glabrous, very narrow. Corolla gradually narrowed. Anther-base acutely produced; apex of connective lanceolate. Achenes 10-costate, thinly pilose when ripe, with small glandular points visible between the ridges. Pappus duplex, scabrid, pale-tawny; outer setæ much shorter.—*V. cylindrica*, Rich. Fl. Abyss. i. 374, non Schultz Bip. fide Vatke in Linnæa, xxxix. p. 476 (1875).

Nile Land. Abyssinia, *Petit!*

Mozamb. Distr. Zambesia, Manganja Hills, *Meller!* native name Foutra; fl. in September.

77. **V. Francavillana,** *O. & H.* Shrubby; shoots subterete, closely and shortly tawny-velvety as well as the petioles and peduncles. Leaves alternate, narrowly elliptical, acuminate, attenuate at the base into the petiole, denticulate or subentire, firmly submembranous, subglabrous, 3–4½ in. long by 1 in. wide; petioles patent, about 1 in. long. Capitula campanulate-oblong, 5-flowered, ¼–½ in. long, subsessile, in a dense terminal corymbose panicle 6 in. wide. Scales of the involucre pluriseriate, pale, shining, subglabrate, outer small, not appressed,

rounded, persistent, inner caducous, $\frac{3}{8}$ in. long, oblong, acute, often tipped with pale purple. Receptacle narrow. Achenes about 10-costate, setulose but not densely so, dark brown, sessile-glandular. Pappus nearly white, sub-biseriate, barbellate, setiform; outer shorter.

Nile Land. Abyssinia, Gondar, *D'Héricourt!*

78. **V. myriantha,** *Hook. f. in Journ. Linn. Soc.* vii. p. 198. A tree of 20 ft., with dark angular striate glabrate branches, pubescent towards the extremities. Leaves alternate, membranous, narrowly elliptical or oblong-lanceolate, acute or acuminate, narrowed into the petiole, unequally serrulate, obsoletely puberulous beneath, at length glabrate, varying to over 1 ft. in length and 3 in. in breadth; petiole 1–2 in., dilated and clasping at the base. Capitula 4–5-flowered, shortly pedicellate or sessile, in dense corymbose terminal and axillary panicles $\frac{1}{2}$–1 ft. broad. Involucral scales multiseriate, coriaceous, glabrous or ciliolate, outer much smaller, ovate-rotundate; inner oblong, obtuse, with a dark apical spot, caducous. Receptacle narrow, glabrous. Corolla gradually narrowed, glabrous. Anther-base obtuse; apical connective lanceolate, obtuse. Achenes 9–10-ribbed, scattered with ascending pilose hairs, callus-based. Pappus sub-uniseriate, scabrid, brittle; setæ mostly equal with a few shorter ones, yellowish-tawny, rigid.

Upper Guinea. Fernando Po, Clarence Peak, 4–5000 ft. alt., *Mann!* Cameroon Mountains, 3–7000 ft. alt., *Mann!* flowers in December.

EXCLUDED AND UNKNOWN SPECIES OF VERNONIA.

Vernonia cernua, Boj., which is *Moquinia Bojeri,* DC. Prodr. vii. p. 23, from the island of Zanzibar, is unknown to us, and its proper position in the Natural Order is uncertain. See Benth. et Hook. f. Gen. Pl. ii. p. 490.

Vernonia Rueppelii, Schultz. Bip. in Walp. Rep. ii. p. 946, from Abyssinia, has the numerous few-flowered capitula of the section *Strobocalyx,* but the flowers are said to be yellow; it is unknown to us.

Cyanopis Borianiana, Schultz. Bip. in Schweinf. et Aschers. Enum. p. 284, name only, from Sennaar, is unknown to us.

7. HERDERIA, Cass.; Benth. et Hook. f. Gen. Pl. ii. 232.

Capitula homogamous, florets tubular. Involucre campanulate or hemispherical, scales pauciseriate, imbricate, free, or inner confluent $\frac{1}{2}$–$\frac{3}{4}$ their length. Receptacle naked. Corolla regular, 5-fid. Style-branches subulate, minutely hairy. Achenes acutely or obscurely 3–5-gonous, glabrous or hairy, apex truncate. Pappus of short ascending or at length stellate-patent scales, ciliate or pubescent, often with 1 or more setæ, exceeding the coroniform scales.—Diffuse decumbent leafy annual herbs. Leaves alternate. Capitula small, solitary or loosely cymose.

Hitherto only found in North Tropical Africa.

Heads solitary, terminating the leafy branches. Inner involucral scales connate. Achenes angular, glabrous . . . . . 1. *H. truncata.*

Heads loosely cymose. Involucral scales free, acute. Achenes pubescent . . . . . 2. *H. stellulifera.*

1. **H. truncata,** *Cass.*; *DC. Prodr.* v. p. 13. Diffuse creeping or decumbent annual, not more than 1 ft. high, varying much in indumentum, pubescent hirsute or some specimens nearly glabrous, leafy. Leaves obovate or oblanceolate, rounded at apex, cuneately narrowed at base into short petiole, subentire or with a few teeth above, $\frac{1}{4}$–$1\frac{1}{2}$ in. long by $\frac{1}{8}$–$\frac{1}{2}$ in. wide. Capitula terminal, solitary, hemispherical, many-flowered, $\frac{1}{4}$ in. wide, with foliaceous bracts at base. Scales of involucre herbaceous; outer oblanceolate or linear-spathulate, adnate below to inner which are confluent $\frac{1}{2}$–$\frac{2}{3}$ their length and equal the fruit. Achenes glabrous, acutely 3–4-gonous, narrowed below. Pappus squamiform; squamæ 8–12, blunt, ciliate, at length stellate-patent; 1–3 squamæ often elongated, setaceous, 2–3 times longer than the rest. *Amphérephis senegalensis*, Less. in Linnæa, vi. 687.

Upper Guinea. Senegal, *Perottet! Lelierre!* Niger, *Barter!* (flowers crimson).

2. **H. stellulifera,** *Benth. Niger Fl.* p. 425. Diffuse decumbent annual, 2 ft. high; branches slender, striate, softly pubescent. Leaves ovate, acute or obtuse, abruptly narrowed into petiole, membranous, crenulate or subentire, pubescent beneath or subglabrous, $\frac{1}{2}$–$1\frac{2}{3}$ in. long by $\frac{1}{6}$–$1\frac{1}{4}$ in. wide; petiole $\frac{1}{3}$ in. long or less. Capitula widely campanulate, about 20-flowered, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, on unequal slender pedicels ranging up to $\frac{2}{3}$ in. long, in loose corymbose cymes. Scales of involucre pauciseriate, free, acutely apiculate, pubescent, scattered with sessile glands, inner linear, outer subulate; receptacle flat, glabrous. Flowers violaceous. Anther-base rather obtuse. Achenes hispidulous, obscurely angled. Pappus minute, coroniform, ciliate or with 1–3 setaceous squamæ.

Upper Guinea. Sierra Leone, *G. Don! Afzelius!* Fernando Po, *Vogel! Barter!* Sierra del Crystal, *Mann!* Akele country, 200 miles up the Ogovi River, *Dr. Nassau!*
Wile Land. Niamniam-land, *Schweinfurth!*

8. **ELEPHANTOPUS,** L.; Benth. et Hook. f. Gen. Pl. ii. 237.

Capitula homogamous, 2–5-flowered, collected in ovoid or globose bracteate heads. Involucre oblong or narrowly ovoid, scales usually biseriate, outer shorter; receptacle naked or alveolate. Corolla subregular or limb subpalmatifid 4–5-fid. Anther-base sagittate. Style-branches subulate, glabrate or minutely hairy. Achenes subterete or subangular, narrowed at base, apex truncate, 10-costate or costæ obsolete; pappus 1–2-seriate; setæ definite (5–6) or indefinite, subequal. —Erect somewhat rigid herbs, pubescent villous or setose. Leaves alternate, penniveined; petiole sheathing at base. Capitula, in African species, in globose terminal bracteate heads, solitary or divaricately panicled.

A small genus, chiefly tropical American. *E. scaber* is the only species common in the tropics of both hemispheres. *E. senegalensis* is peculiar to Upper Guinea.

Heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam., pedunculate in divaricate panicles. Pappus of 5–6 setæ . . . . . 1. *E. scaber.*
Heads 1–$1\frac{1}{2}$ in. diam., sessile, overtopped by upper leaves. Pappus 2-seriate of ∞ setæ . . . . . 2. *E. senegalensis.*

1. **E. scaber,** *L.*; *DC. Prodr.* v. p. 86. Erect herb from 2 to as much as 8 ft. in height, more or less hirsute or shortly villous; stem terete, striate, with short subpatent hairs throughout. Leaves oblanceolate to obovate-elliptical or -oblong, subacute or broadly pointed, narrowed into short petiole, crenate-serrate with a minute apiculus or mucro directed forwards on each serrature, scabrid, thinly hirsute or glabrate above, more or less pubescent or thinly hairy, especially on the rather prominent nerves beneath; cauline 4–8 in. long, $1\frac{1}{3}$–$3\frac{1}{2}$ in. broad; petiole amplexicaul. Heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam., with an involucre of 3–5 ovate or ovate-rotundate bracts shorter than or a little exceeding the head. Involucral scales 8, 2-seriate, inner 4 twice as long as and opposed to outer, oblong-lanceolate acute, outer lanceolate. Achenes narrowed towards base, 10-costate, minutely setulose. Pappus 1-seriate, of 5–6 subequal slender minutely scabrid setæ, dilated at base.

Upper Guinea. Fernando Po and Prince's Island, *Barter! Mann!* Sierra Leone, *Afzelius!*

Nile Land. Karagué, *Speke and Grant!* Djur-land, *Schweinfurth!*

A common weed throughout the tropics, reaching Northern Australia.

2. **E. senegalensis,** *O. & H.* Branches leafy, subterete, sulcate, thinly setose or at length glabrous, with internodes of 2–3 in. Leaves linear-oblong, acute, obscurely or broadly crenate-denticulate, narrowed at base into winged petiole which forms a short strongly-nerved ochreate sheath round the stem, scabrid above and below with stiffish hairs or setæ; 4–5 in. long; $\frac{1}{2}$–$\frac{3}{4}$ in. broad. Capitula collected in a solitary terminal head, 1–$1\frac{1}{2}$ in. diam., surrounded and much overtopped by the sessile upper leaves broadly dilated at base, 3–4-flowered; inner scales of involucre linear-oblong, acuminate, outer lanceolate or ovate-lanceolate, rigid or coriaceous, very acute, sheathed, at least in part, by ovate-lanceolate coriaceous scales, acuminate and conduplicate above, which equal or overtop the florets. Receptacle narrow. Corolla not seen. Achenes subtrigonous or obtusely angular, clothed with short whitish subappressed hairs, and with about 10 obscure costæ, scarcely perceptible until the hairs are removed. Pappus 2-seriate, setaceous, setæ ∞, subequal, minutely scabrid.—*Synchodendron senegalense,* F. W. Klatt in Ann. Sc. Nat. ser. v. vol. xviii. p. 364.

Upper Guinea. Senegambia, *Heudelot!*

9. **ADENOSTEMMA,** Forst.; Benth. et Hook. f. Gen. Pl. ii. 239.

Capitula homogamous, hemispherical; scales sub-biseriate, imbricate. Receptacle naked. Florets tubular; corolla tubular or slightly dilated, shortly 5-toothed. Anthers unappendaged or apex minutely apiculate. Achenes 5–3-gonous, narrowed to base. Pappus of 3–5 short rigid gland-tipped setæ.—Glabrous or pubescent herbs. Leaves opposite, petiolate, penniveined. Capitula pedunculate, loosely panicled.

A small genus confined to America with the exception of the following species, which is a common tropical weed, reaching northward to Japan.

1. **A. viscosum,** *Forst.*; *DC. Prodr.* v. p. 111. Herb, 2–4 ft. high, erect or ascending, subsimple or branched; branches terete or sub-

angular, striate, glabrous or glandular-puberulous. Leaves ovate, acute or obtuse, cuneate at the base into petiole, serrate- or crenate-dentate, membranous, scaberulous or glabrate, ranging up to 6 in. long by 3¼ in. wide, upper smaller and fewer; petioles ranging up to 2½ in. long or more, upper and in some forms all shorter. Capitula ¼–⅔ in. wide, on unequal usually slender pedicels, sometimes 1½ in. long, in loose or rarely rather dense dichotomous usually viscous-pubescent axillary and terminal panicles. Scales of involucre oblong, sub-biseriate, equal, blunt, nearly glabrous. Corolla white. Achenes more or less muricate or tuberculate or rarely quite smooth.—*A. Perrottetii*, DC. l. c. 110. *A. mauritianum*, DC. l. c. 110. *A. Dregei*, DC. l. c. 111. *A. caffrum*, DC. l. c. 112. *A. natalense*, DC. l. c. 112. *A. Schimperi*, Sch. Bip. in Pl. Schimp. Abyss. § i. n. 112 (Inflorescence rather dense).

The rest of the synonymy is omitted.

Upper Guinea. Fernando Po, 4–8000 ft. alt.; *Mann!* Cameroon Mountains, 2500–7500 ft. alt., *Mann!* Niger, *Barter!* Sierra Leone, *Afzelius!*

Nile Land. Abyssinia, *Schimper!* Niamniam-land, *Schweinfurth!*

Lower Guinea. Congo, *Chr. Smith!* Loango, *Soyaux!*

10. **AGERATUM,** L.; Benth. et Hook. f. Gen. Pl. ii. 241.

Capitula homogamous. Involucre campanulate; scales 2–3-seriate, linear, acute, subequal; receptacle convex (or plane), naked (or paleaceous). Corolla tubular, slightly dilated above and narrowed at the 5-toothed mouth. Anther-base obtuse, tip ovate. Achenes 5–4-angular; pappus of 5–4 scaberulous setæ, dilated and lanceolate at base (or setæ connate below or 10–20 narrower).—Herbs. Leaves opposite or upper alternate. Capitula small or medium in paniculate corymbs. Flowers blue purplish or white.

Confined to America with the exception of the following species, a common weed throughout the warmer regions of the globe.

1. **A. conyzoides,** *L.*; *DC. Prodr.* v. p. 108. Erect branching annual, varying to 3 ft.; branches subterete, finely striate, hirsute above. Leaves ovate, obtuse or subacute, base abruptly or obtusely narrowed, crenate or crenate-serrate, 1–3 in. long, ½–2 in. broad; petiole varying to 1 or 2 in., often much shorter. Capitula ¼ in. diam., in dense terminal panicled corymbs. Involucre nearly glabrous. Achenes black, glabrous or obsoletely setulose.

Widely spread in Tropical Africa.

11. **EUPATORIUM,** L.; Benth. et Hook. f. Gen. Pl. ii. 245.

Capitula homogamous, few or many-flowered. Involucre oblong or various, scales pauci- or multi-seriate, imbricate, outer gradually shorter or all subequal. Receptacle naked. Corolla regular, in the following species slightly dilated to the shortly 5-fid mouth. Anther-base obtuse or subtruncate, -tip short, ovate. Style-branches elongate, slightly

clavate. Achenes 5-angled, truncate; pappus setaceous, 2–3-seriate, scabrid.—Herbs or shrubs usually with opposite, in the following species with alternate leaves, entire or toothed. Capitula usually corymbose. Flowers purplish or white.

A large genus, most abundant in the New World, more sparingly represented in Asia and Europe; wanting with this exception in Tropical Africa and Australia.

1. **E. africanum,** *O. & H.* Herb, probably 2–4 ft.; branches erect, striate, pubescent, obtusely angular, leafy. Leaves alternate or here and there subopposite, ovate or ovate-lanceolate, obtusely pointed, uppermost reduced and acuminate, dentate- or incise-serrate, or upper leaves entire above, base rounded, 3-plinerved, 3 in. long, 2 in. broad; petiole $\frac{1}{6}$ in. Capitula few- (about 5-) flowered, oblong-campanulate, $\frac{1}{6}$ in. wide, on short pubescent pedicels, collected in dense corymbose terminal cymes, $1\frac{1}{2}$–4 in. broad. Involucral scales about 8, sub-biseriate, inner oblong, obtuse, pilose above, outer shorter. Achenes sparsely pubescent; pappus 2–3-seriate, of about 30 scabrous setæ.

Nile Land. Niamniam-land, *Schweinfurth!*
Mozamb. Distr. Moramballa, alt. 1200 ft,, January, *Dr. Kirk!*
E. sinuatum, Lour. Fl. Coch. 487 (*E. hispidum,* Pers., DC. Prodr. v. 183), from Mozambique Island, is unknown to us. De Candolle suggests it may be a *Vernonia.*

12. MIKANIA, Willd.; Benth. et Hook. f. Gen. Pl. ii. 246.

Capitula homogamous, usually 4-flowered. Involucre oblong, scales 4 (or 5), imbricate, nearly equal. Receptacle small, naked. Corolla regular, tubular, infundibuliform above, 5-toothed. Anther-base obtuse, tip ovate or lanceolate. Achenes acutely 5-angular, apex truncate, pappus 1- (2-) seriate, scabrid, setæ free or connate at base.—Herbs or shrubs, usually scandent or twining. Leaves opposite, petiolate. Capitula small, corymbose in the following species; florets white, purplish, or pale yellow.

A large American genus with the following outlier which is widely distributed in the warmer regions of both hemispheres.

1. **M. scandens,** *Willd.; DC. Prodr.* v. p. 199. Twining or scandent, attaining occasionally many (40) feet in height, glabrous or pubescent; branches terete, striate. Leaves from ovate to deltoid or hastate, from a cordate or auricled base, acute or acuminate, subentire repand or dentate, membranous, varying from 1 or 2 to 5 in. in length; petioles $\frac{1}{2}$–5 in. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. long, glabrate or puberulous, subsessile, in terminal and axillary pedunculate corymbose panicles; scales oblong acute. Achenes glabrous or nearly so, usually sessile-glandular; pappus 1-seriate, white or reddish.—*Eupatorium scandens,* L.; *Mikania chenopodifolia,* Willd., DC. l. c. 201; *M. natalensis, M. capensis* and *M. oxyota,* DC. l. c. 198; *M. mossambiquensis,* Steetz in Peters' Mossamb. Bot. i. 377. *Mikaniæ* specimen in Herb. Lindl. (Cantab.)! *M. tamoidi,* affine ex DC. l. c. 203, obs. 2.

Upper Guinea. Senegambia, Sierra Leone, *Don! Afzelius!* Niger, Fernando Po, *Th. Vogel!* and others. Cameroons, 4–7000 ft., *Mann!* Nun River, *Mann!*

Nile Land. Abyssinia, *Dr. Roth!*
Lower Guinea. Congo, *Chr. Smith!* Loango, *Soyaux!*
Mozamb. Distr. Luabo River, *Dr. Kirk!* Murchison Falls, Shire, *Dr. Meller!* Native name, "Wedwedwi." Zambesi, *Dr. Peters!* Zanzibar Coast, *Hildebrandt!*

13. MICROTRICHIA, DC.; Benth. et Hook. f. Gen. Pl. ii. 260.

Capitula hemispherical or broadly campanulate, outer florets ♀, of the disk ☿. Involucral scales 2–3-seriate, membranous-margined, nearly equal, shorter than the florets. Receptacle convex, naked. Corolla of ♀ fl. tubular, mouth denticulate, of ☿ fl. campanulate, narrowed at base, shortly 4–5-fid. Anther-base obtuse, apex shortly produced, oblong-lanceolate. Style-branches with lanceolate acute tips. Achenes subterete or slightly compressed; pappus of few cellular-subulate denticulate very caducous setæ.—Herb or undershrub, more or less pubescent. Leaves alternate, dentate. Capitula small, many-flowered, yellow.

Confined to Tropical Africa.

1. **M. Perrottetii,** *DC. Prodr.* v. p. 366. A diffuse much-branched pubescent or puberulous annual, varying to 1 ft. or more in height. Leaves obovate, obtuse, cuneately narrowed into the petiole, coarsely toothed above, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$–1 in. broad; petiole of lower leaves 1 in. or more, upper shorter. Capitula $\frac{1}{8}$–$\frac{1}{6}$ in. diam., subsessile or shortly pedunculate, in small terminal or subterminal clusters. Involucral scales oblanceolate or linear, 2–3-seriate, subequal, rather acute, cellular-dentate, outer loosely pilose. Achenes thinly scattered with short spreading minutely glochidiate setæ, subterete or slightly compressed. Pappus as described above.

Upper Guinea. Senegambia, *Heudelot!* Nigritiana, *Barter!*
North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. Bongo-land, *Schweinfurth!*
We have not seen authentic specimens of *M. Perrottetii*, and some doubt attends our identification, especially that De Candolle l.c. describes this species, gathered by Perrottet, as sessile-leaved, flowering extremities leafless, 1-headed, and the achenes turbinate.

14. DICHROCEPHALA, DC.; Benth. et Hook. f. Gen. Pl. ii. p. 260.

Capitula heterogamous globose or disciform, many-flowered, outer ♀ ∞-seriate, of the disk ☿. Involucre inconspicuous, scales subbiseriate, subequal, membranous-margined. Receptacle convex columnar or turbinate, naked. Corolla of ♀ fl. rotate-campanulate 3–4-fid or tubular dentate; of ☿ fl. tubular dilated above, 4–5-dentate, or campanulate constricted below. Anther-base 2-dentate. Style-branches flattened with lanceolate or ovate appendix. Achenes compressed; pappus 0 (or of ☿ fl. very minute).—Annual herbs. Leaves alternate, dentate or lyrate-pinnatifid. Capitula small with inconspicuous invo-

lucres, in terminal often divaricate panicles. Corolla of ♀ fl. white of ☿ violet or purple.

A small genus of the Old World Tropics.

Corolla of ♀ florets tubular . . . . . 1. *D. latifolia.*
Corolla of ♀ florets rotate-campanulate . . . . . 2. *D. chrysanthemifolia.*

1. **D. latifolia,** *DC. Prodr.* v. p. 372. Erect or ascending herb ½–5 ft. high, asperulous or minutely setulose; stem and branches angular. Leaves lyrate-pinnatifid, acute or obtuse, terminal lobe ovate or ovate-rotundate, or lateral lobes wanting, dentate, sessile or attenuate at base into alate or slender petiole, membranous, 1½–3 in. long; upper smaller. Capitula subglobose, many-flowered, ⅕–¼ in. diameter, on unequal pedicels ranging up to 1 in. long, in lax terminal divaricate panicles. Scales of involucre subbiseriate, obovate or broadly elliptical, membranous-margined, fimbriate-ciliate, nearly glabrous. Receptacle depresso-convex, glabrous, papillose-pitted, constricted below, 1/20 in. broad. Corolla of ♀ fl. tubular 2–3-dentate; of ☿ fl. campanulate constricted below. Achenes obovate, compressed, glabrous or very nearly so.—*D. abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. i. 176, ii. 949, non i. 87, nec iii. 1847.

Abyssinian names *Kulle gab*, *Kulegale*.
Upper Guinea. Cameroon Mountains, 7–8000 ft. alt., *Mann!*
North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. Abyssinia, *Schimper! Q. Dillon, Plowden!*
Mozamb. Distr. East African chain, alt. 4700 ft. *Speke and Grant!*
Occurs also in the Levant, the East Indies and Hong-Kong.

2. **D. chrysanthemifolia,** *DC. Prodr.* v. p. 372. Erect herb, 1–5 ft. high, simple or branched above; stem and branches terete, obscurely striate, shortly hirsute or shining and glabrate below. Leaves oblong or obovate, incise-lyrate, obtuse or acute, dentate with acute or mucronate teeth, sessile or lower contracted into widely alate petioliform auriculate-amplexicaul base, membranous, appressedly hairy; lower 1½–4 in. long, upper shorter. Capitula globose or globose-oblong, many-flowered, ⅕–¼ in. diameter, on unequal pedicels ranging up to 1½ in. long, in lax terminal divaricate panicles. Scales of involucre 6–8, herbaceous, pubescent, ovate or elliptical or oblong, with membranous fimbriate-ciliate margins. Receptacle turbinate or columnar, closely tuberculate, glabrous. Corolla of female fl. rotate-campanulate, 3–4-fid. Achenes compressed, glabrous, obovate.—*D. abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. i. 87, iii. 1847, non i. 176 nec ii. 949; *D. oblonga*, Hook. f. in Journ. Linn. Soc. vi. 12 (form with more oblong capitula); *D. macrocephala*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. 145.

Abyssinian name *Kullegab*.
Upper Guinea. Fernando Po, top of peak, *Mann!* Cameroon Mountains 7–8000 ft. alt. *Mann!*
Nile Land. Abyssinia, *Schimper! Petit! Hildebrandt!*
Occurs also in East Indies and Madagascar.

15. **GRANGEA,** Adans.; Benth. et Hook. f. Gen. Pl. ii. p. 261.

Capitula heterogamous disciform; outer florets 1–∞-seriate ♀, disk-fl. ∞ ☿. Involucre at first hemispherical, scales pauciseriate nearly equal, inner with membranous margins. Receptacle convex or conical naked. Corolla of ♀ fl. narrow-tubular, mouth toothed 2–4-fid; of ☿ fl. campanulate, 4–5-fid narrowed into slender tube. Anther-base obtuse. Style-branches with short deltoid appendix. Achenes subterete or but slightly compressed, with or without a distinct cartilaginous apex, equalling or narrower than the ovary in diameter, bordered by the minute free subpaleaceous teeth of the pappus.—Erect or decumbent more or less hairy herb. Leaves alternate pinnatifid. Capitula yellow of medium-size, terminal or leaf-opposed.

Regarding the thickening of the roof of the ovary and number of ♀ florets as variable characters, we have been induced to treat all the forms known to us as conspecific, notwithstanding their distribution under three subgeneric sections by De Candolle. Distributed all over Egypt and parts of Asia.

1. **G. maderaspatana,** *Poir. Encycl. Suppl.* ii. p. 825. Procumbent, or ascending, branching, often freely from the crown, hirsute herb, varying from a few inches to a foot or more. Leaves obovate pinnatifid winged to the sessile base, ½–3 in. long, lobes oblong or obovate obtuse entire or toothed. Capitula ¼–⅓ in. diameter, solitary or 2–3 together, terminal or leaf-opposed on peduncles of ¼–1 in. Involucral scales oval obtuse pubescent or hirsute.—*Cotula Sphæranthus,* Link Enum. Pl. ii. 344; *Grangea Sphæranthus,* C. Koch in Bot. Zeit. i. 41 (1843).

De Candolle (Prod. v. 373) maintains as specifically (and subgenerically) distinct three forms, which we have been induced to regard as modifications of one species, differing in the relative proportion of pistillate and hermaphrodite florets and in the development of a cellular thickening to the roof of the ovary, which he (De Candolle) regarded as a process of the achene and Cassini as consolidated fleshy pappus. These principal forms are (*G. maderaspatana*) pistillate florets ∞-seriate, apex of achene thickened, equal in diameter to ovary; (*G. ægyptiaca,* DC. l.c.) regarded as an undoubted form of *G. maderaspatana,* by Steetz, thickened apex of achene more or less constricted; (*G. ceruanoides,* Cass., *G. procumbens,* DC.) apex of achene not or but slightly thickened, and ray-florets 2-seriate.

Upper Guinea. Senegambia, *Döllinger!* and others (*G. procumbens* and *G. ceruanoides*); Nigritania, *Barter!* (*G. ceruanoides*).

Nile Land. Senaar, *Kotschy!* and by Nile 14–15° N.L., *Speke and Grant!* (near *G. ceruanoides*); Khartoum, *Petherick!* Bongo-land, *Schweinfurth!*

Lower Guinea. Congo, *Chr. Smith! Burton!* Loango, *Soyaux!*

Mozamb. Distr. Zambesia and elsewhere, *Dr. Peters.*

16. **CERUANA,** Forsk.; Benth. et Hook. f. Gen. Pl. ii. p. 261.

Capitula heterogamous disciform many-flowered; outer florets ♀ 2–3-seriate, disk ☿. Involucre hemispherical, scales 2–3-seriate, her-

baceous, outer often leafy. Receptacle flat, tubercled, paleaceous, paleæ coriaceous linear exceeding the ovaries. Corolla of ♀ fl. narrow-tubular, mouth obliquely toothed or with a rudimentary ligule; of ☿ fl. campanulate narrowed into tube. Anther-base obtuse entire. Style-branches with lanceolate acute papillose appendices. Achenes compressed or obscurely angled, crowned with a minute papillose-setiform annulus.—Erect rigid herb. Leaves alternate toothed or pinnatifid. Capitula erect, cymose, yellow.

Based upon the following species.

1. **C. pratensis,** *Forsk.*; *DC. Prodr.* v. p. 488. Erect branched hirsute or pubescent annual, 1–2 ft. high; stem strict or ascending; branches terete faintly striate. Leaves obovate, rounded at apex, pinnatifid or coarsely toothed, hairy on both sides, more or less narrowed to a clasping sessile often auricled base, or petiolate, lower $1\frac{1}{2}$–$2\frac{1}{2}$ in. long; upper shorter, sometimes lyrate or subentire. Capitula $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, subsessile or on peduncles varying to 2 in., terminal and leaf-opposed along the branches of dichotomous cymes, surrounded at or near the base by 2 or more bracts equalling or overtopping the heads. Scales of involucre herbaceous unequal; outer rather exceeding the disk, uni-biseriate, erect, hairy, lanceolate, acute; inner about equalling the disk, coriaceous, linear-oblong, acute. Paleæ of receptacle fimbriate-ciliate at base, slightly dilated above, exceeding ovaries. Ray fl. 2–3-seriate. Achenes glabrous. Pappus minute, papillose-setiform.—*C. rotundifolia*, Cass. Dict. xli. p. 123; *C. senegalensis*, DC. l.c.; *Buphthalmum pratense*, Vahl Symb. i. p. 75.

Upper Guinea. Senegambia, *Perrottet!* 423; Niger, *Barter!*
Nile Land. Chartoom, Blue Nile, Upper Nubia, *Dr. Kotschy! Dr. Bromfield!* Sennaar, *Brocchi;* Cordofan ex Aschers. & Schweinf. Enum. p. 284.
Occurs also in Egypt.

17. **BRACHYCOME,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 264.

Capitula heterogamous radiate; ray-fl. 1-seriate, disk-fl. ∞ hermaphrodite tubular. Involucre broadly campanulate or patelliform, scales subbiseriate. Receptacle conical naked. Corolla of ray-fl. ligulate, white or purplish, spreading or recurved in the following species, much exceeding the involucre. Anther-base obtuse entire. Style-branches with shortly ovate or deltoid appendices. Achenes slightly compressed; pappus 0 (or short paleaceous).—Erect or ascending herbs with single-headed scapes, or branching. Leaves alternate, radical or cauline (entire) toothed or pinnatifid. Capitula usually small or of medium size, pedunculate.

A considerable genus, chiefly Australasian.

1. **B. mossambicensis,** *O. & H.* Decumbent or ascending herb, $\frac{1}{2}$–1 ft. high, branching from the base, more or less hirsute with spreading hairs. Leaves oblong or oblanceolate, pinnatifid with oblong or lanceolate lobes or coarsely toothed, acute or obtusely pointed, more or less attenuate to a clasping base, lower from $1\frac{1}{2}$–3 in. long, petiolate, upper shorter. Capitula hemispherical, many-flowered,

about $\frac{1}{4}$–$\frac{1}{3}$ in. diameter, solitary on peduncles $\frac{1}{2}$–2 in. long, terminating the branches and bearing occasionally a few alternate bracts. Scales of involucre narrowly elliptical, acute or subacute, pilose, subequal, appressed. Ray-fl., ligule linear recurved white bidentate 2–4 times longer than involucre. Achenes subcompressed, obovate-oblong, minutely hairy, obscurely angled.

Mozamb. Distr. Moramballa and Zambesi Delta, *Dr. Kirk!*

18. **FELICIA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. 274.

Capitula heterogamous, radiate. Florets of ray 1–2-seriate pistillate, of disk perfect or the inner or all sterile. Involucre hemispherical or broadly campanulate, scales 2–∞-seriate, imbricate, narrow, with scarious margins, outer smaller or nearly equalling the inner. Receptacle plane, naked or foveolate. Corolla of ray ligulate, of disk regular tubular gradually dilated to 5-toothed mouth. Anther-base obtuse unappendaged, tips lanceolate. Achenes compressed ecostate, or with 1–2 slender costæ; pappus setaceous, 1-seriate scabrid, caducous or subpersistent, sometimes with a minute outer series.—Low shrubs or herbs, often much-branched at base. Leaves alternate, entire or toothed. Capitula usually distinctly pedunculate. Ray-florets blue or white.

A considerable genus confined to the Cape of Good Hope with the exception of the two following species.

Herb from wiry stock. Leaves narrow-elliptic-oblong and peduncles hispid	1. *F. Richardi.*
Shrubby. Leaves narrow-linear. Peduncles glandular-puberulous	2. *F. abyssinica.*

1. **F. Richardi,** *Vatke in Linnæa* xxxix. p. 481 (1875). Stock slender or wiry; branches ascending or erect, terete, hirsute, leafy below, $\frac{1}{4}$–$\frac{3}{4}$ ft. high, simple, terminating in 1-headed peduncles of 1–4 in., naked or 1–2-bracteate. Leaves alternate, narrow-elliptic-oblong or oblanceolate, obtuse and shortly apiculate or acute, base attenuate, subsessile, entire or with 1–2 small teeth, hispid or setulose, margin more or less revolute; about 1 in. long $\frac{1}{5}$ in. broad. Capitula campanulate $\frac{1}{2}$–$\frac{3}{4}$ in. diameter. Involucral scales pluriseriate, linear-lanceolate, acute, setose-hirsute, loosely appressed, inner nearly $\frac{1}{2}$ in. long, scarious-margined. Ray-florets 12–15. Apical connective of anthers linear-oblong. Achenes oblong compressed sericeous. Pappus 1-seriate, setaceous, scabrid, tawny, subequal.—*Agathæa abyssinica,* Hochst. in Hb. Schimp. Abyss. sec. iii. 1890; *Aster abyssinicus,* Hochst. l.c. sec. i. 37; *Agathæa dentata,* Rich. Fl. Abyss. i. 384 (a more luxuriant form, less hispid and with distinctly toothed leaves).

Nile Land. Abyssinia, *Schimper! Dillon and Petit!* &c.

2. **F. abyssinica,** *Sch. Bip. in Hb. Schimp. Abyss.* sec. iii. 1763; *Rich. Fl. Abyss.* i. 383. Low shrubby much-branched $\frac{1}{3}$–1 ft. high or more; branches terete, leafy, extremities hirsute, older glabrate, rugose with prominent scars of fallen leaves. Leaves closely alternate, linear, somewhat narrowed to each end, sessile, entire, or minutely setulose-

serrulate, hirsute or setose, $\frac{1}{3}$–$\frac{2}{3}$ in. long. Capitula hemispherical, $\frac{1}{2}$ in. wide (exclusive of ray), solitary terminal on naked glandular-puberulous peduncles 1–2 in. long. Involucral scales 3–4-seriate, linear-lanceolate acutely acuminate, glandular-pubescent where exposed; outer stouter, loosely appressed. Receptacle naked. Ray-florets revolute, linear-oblong, sky-blue or violaceous. Achenes thinly setulose. Pappus uniseriate scabrid white caducous.—*Pulicaria viscida*, R. Br. in Salt, Trav. App. p. lxv. fide Sch. Bip. in Schw. Fl. Æthiop. 307. *F. Schimperi*, St. et Hochst.; Jaub. et Spach, Ill. Pl. Or. t. 354.

Nile Land. Abyssinia, *Schimper!* and others; Somali-land, *Hildebrandt*.
Extends to Arabia Felix.

19. **ERIGERON,** L.; Benth. et Hook. f. Gen. Pl. ii. p. 279.

Capitula heterogamous; florets of ray numerous 1–∞-seriate pistillate, disk-florets perfect (or staminate). Involucre hemispherical or campanulate, scales subbiseriate narrow, outer usually rather stouter. Receptacle naked (more rarely alveolate and fimbrilliferous). Ray-florets all or outer only ligulate, ligule narrow or filiform; disk-florets tubular, slightly dilated to the 5–4-toothed mouth. Anther-base obtuse unappendaged. Style-branches more or less flattened, lanceolate or ovate-lanceolate (rarely, linear) papillose. Achenes much or slightly compressed, often with reniform margins. Pappus setaceous, 1-seriate (or biseriate).—Annual or perennial herbs. Leaves alternate, entire, toothed (or divided). Capitula various in size, solitary or cymose. Ray violet purple or white.

A large genus of the temperate regions of both hemispheres.

Heads singly terminating the branches, $\frac{3}{4}$–1 in. diam. . . .	1. *E. alpinus.*
Heads laxly cymose, $\frac{1}{3}$ in. diam.	2. *E. Grantii.*

1. **E. alpinus,** *Linn. Sp. Plant.* edit. i. p. 864 (1753); *DC. Prodr.* v. 291. Erect herb, with strict ascending, sparsely pubescent striate branches, terminating in solitary or subsolitary capitula. Leaves (cauline) alternate or rarely subopposite, linear-oblong or elongate-lanceolate, mucronate, with a wide sessile somewhat clasping base, submembranous, quite entire, thinly strigillose on both sides or glabrate, 1-obscurely 3-nerved, ranging up to 3 in. long by $\frac{3}{8}$ in. broad. Capitula hemispherical, ∞-flowered, $\frac{1}{4}$–1 in. diameter, on erect strigose-hispid peduncles 1–5 in. long. Scales of involucre subbiseriate, narrowly linear-lanceolate, acute, pilose with whitish spreading rather stiff and broad hairs; inner ones rather more and outer ones rather less than $\frac{1}{4}$ in. long. Receptacle naked, $\frac{1}{4}$ in. diameter. Ray-fl. 1-seriate, purple, not broader than involucral scales and exceeding them by about the length of the latter, erect-patent. Interior female fl. tubular-filiform, numerous. Achenes narrowly obovoid-oblong, compressed, with 2 strong lateral nerves, thinly pilose. Pappus uniseriate, subrufous, barbellate, twice length of achene.—*E. glabratus*, Hoppe et Hornsch.; Vatke in Linnæa xxxix. p. 481 (1875).

Nile Land. Abyssinia, *Schimper!*
Occurs in several forms in the Alps and Arctic regions of both the Old and New World, except Australia.

2. **E. Grantii,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 93, t. 58. Erect annual herb 1–2 ft.; stem terete subsulcate, thinly pubescent, branched above. Leaves linear or linear-oblong, obtuse or subacute, narrowed to sessile base, submembranous, entire or remotely dentate, strigose, obscurely 3-nerved, 1–2½ in. long, ⅛–⅓ in. broad. Capitula hemispherical ∞-flowered ⅓–⅖ in. diameter, on slender pubescent pedicels ⅕–½ in. long in a lax cymose panicle ½ ft. wide. Scales of involucre subbiseriate, inner oblanceolate-linear acuminate with scarious imbricate margins about ⅐ in. long, outer few linear, rather shorter, thinly pubescent. Receptacle naked. Ligulate-fl. 1-seriate, spreading, rather broader than involucral scales, white. Achenes rather narrowly obovoid, more or less compressed, setulose. Pappus thinly 1-seriate, strongly barbellate, white.

Nile Land. Unyoro, *Poloa*?? sp. 2, Speke Journ. App. 638, *Speke and Grant!* covering fallow ground; flowers in August.

Erigeron linifolium, Willd. Sp. Pl. iii. 1955 (*Conyza ambigua*, DC. Prodr. v. 381, excl. synon.; *E. ambiguus*, Schultz Bip. in Webb & Berth. Phyt. Canar. ii. 208), a native of Mediterranean shores, occurs as a waif in Prince's Island, *Barter!*

UNKNOWN SPECIES.

Erigeron Buchingeri, Schultz Bip. in Schweinf. et Aschers. Enum. p. 284, name only, from Abyssinia; *E. erythrolepis*, Schultz Bip., l.c., from Abyssinia; and *E. spathulatum*, Schum. et Thonn. Guin. Pl. p. 385, from Aquapim.

20. MICROGLOSSA, DC.; Benth. et Hook. f. Gen. Pl. ii. p. 282.

Capitula heterogamous; ray-florets ♀ minute multiseriate, disk-florets ☿ few or many. Involucre campanulate; scales 2–4-seriate, imbricate, linear or lanceolate, outer smaller. Ray-florets ligulate, ligule very narrow, scarcely broader than the tube or not exceeding 2–3 times its width, rather shorter than or exceeding the style in length; disk-florets tubular, gradually narrowed. Anther-base obtuse unappendaged. Style-tips lanceolate or ½-conical papillose. Achenes more or less distinctly costate or angular, not at all or slightly compressed; pappus 1-seriate, subequal, setiform.—Shrubs, often scandent or twining, glabrous or pubescent. Leaves alternate, simple, entire, or serrate. Capitula small, in more or less dense paniculate corymbs or cymes; ray white.

A small genus of the Old World Tropics.

Leaves petiolate, ovate or ovate-lanceolate.	
Leaves serrate. Ligule twice breadth of tube	1. *M. densiflora.*
Leaves subentire. Ligule equalling tube in breadth . .	2. *M. volubilis.*
Leaves sessile, base minutely sagittate-auricled	3. *M. sessilifolia.*
Leaves attenuate to a sessile or subsessile not auricled base	4. *M. angolensis.*

1. **M. densiflora,** *Hook. f. in Journ. Linn. Soc.* vii. p. 200. Scandent, reaching 20–25 ft.; branches terete, stout, sulcate, pubescent. Leaves ovate-oblong or -lanceolate, acutely acuminate, obtuse at base, serrate, membranous, scaberulous above, pubescent below, petioled, 2–5½ in. long by ¾–3 in. wide; petioles spreading pubescent ½ in. long. Capitula campanulate, ¼ in. long, many-flowered, on very

short pedicels, densely crowded in many-headed wide corymbose terminal cymes. Scales of involucre 3–4-seriate, puberulous, rather obtuse, ciliolate; inner linear-oblong, scarious, 1-nerved; outer shorter oblong. Receptacle with a few setiform fimbrillæ. Ray linear, equalling twice the tube in width, notched at apex. Hermaphrodite fl. ∞. Style-tips ovate-lanceolate, papillose. Pappus pale-tawny.

Upper Guinea. Cameroon Mountains, 7000 ft. alt., December-January, *Mann!*

2. **M. volubilis,** *DC. Prodr.* v. p. 320. A small shrub or scandent, reaching 3–6 ft. or more; branches terete, sulcate, puberulous. Leaves ovate, acutely acuminate, obtuse at base, subentire, membranous, puberulous or subglabrate, petioled, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long by $\frac{3}{4}$–$2\frac{1}{2}$ in. wide; petioles $\frac{1}{2}$ in. long, dilated at base. Capitula campanulate $\frac{1}{5}$ in. long, on short slender pedicels in dense corymbose terminal cymes 2–8 in. wide. Scales of involucre 3–4-seriate, puberulous, subacute; inner narrowly oblong-lanceolate, outer narrowly ovate. Receptacle naked. Ray-fl. ligulate; ray slender, equalling the tube in width. Pappus more or less reddish.—*M. petiolaris*, DC. l.c. p. 321.

Upper Guinea. Niger, *Vogel! Barter!* Sierra Leone, *Don! Smeathman! Afzelius!* Fernando Po, *Vogel!*
Nile Land. Niamniam-land, *Schweinfurth!*
Mozamb. Distr. Zanzibar Island! Manganja hills, *Dr. Meller!*
Occurs also in Madagascar and in the East Indies.

3. **M. sessilifolia,** *DC. Prodr.* v. 320. Glabrous climbing or twining shrub; shoots flexuose terete striate. Leaves elliptical or narrow-elliptical, acute, mucronate or apiculate, narrowed to the minutely sagittate-auricled base, entire, 2–3 in. long, 1 in. broad, membranous. Capitula campanulate, $\frac{1}{6}$ in. long, subsessile in small subglobose pedunculate terminal and axillary clusters forming ample terminal sometimes elongated panicles $\frac{1}{4}$–$\frac{1}{2}$ ft. wide. Scales of involucre subtriseriate linear acute, with darker midrib; outer shorter. Ray linear erect. Achenes hirsute or glabrate, dark brown, obscurely costate, with white basal callus. Pappus rather dense, 1-seriate, reddish, setæ scabrid.

Upper Guinea. Sierra Leone, *Afzelius!*
Mozamb. Distr. Mozambique, *Forbes!* (specimen so labelled in Herb. Kew. possibly by mistake).
Also in Madagascar.

4. **M. angolensis,** *O. & H.* An erect shrub, 3–5 ft. high. Branches ascending, striate, terete, pubescent, leafy. Leaves linear-elliptical, acute at apex, attenuate to a sessile or subsessile base, puberulous above, pubescent below, margins somewhat revolute, 1–3 by $\frac{1}{8}$–$\frac{2}{3}$ in. Heads numerous, campanulate or at length hemispherical, $\frac{1}{5}$–$\frac{1}{4}$ in long, on slender pedicels of $\frac{1}{10}$–$\frac{3}{4}$ in., in dense corymbose cymes of 2–6 in. diameter; bracteoles filiform, small. Involucral bracts narrow acuminate, the inner ones linear, the outer lanceolate, pubescent outside. Flowers yellow. Ligules narrowly linear, exceeding the style. Achenes somewhat hispid.

Lower Guinea. Angola, *Monteiro!* (100 miles inland from Ambriz).

21. **NIDORELLA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 282.

Capitula heterogamous, florets of ray pistillate ∞-seriate, of the disk ♀ few or many. Involucre hemispherical or campanulate; scales pauci- (1–3-)seriate, subequal. Receptacle naked or fimbrilliferous. Corolla of ray-florets ligulate; ligule narrow or elliptical, entire or toothed, equalling or overtopping the style. Corolla of disk-florets tubular, 5-toothed. Anther-base obtuse or 2-dentate. Style-branches with $\frac{1}{2}$-conical or lanceolate tips. Achenes more or less compressed. Setæ of pappus 1-seriate.—Biennial or perennial herbs, pubescent or hirsute. Leaves alternate, simple. Capitula not exceeding $\frac{1}{3}$ in. diam, in terminal cymose panicles, yellow.

A small genus restricted to the Cape with the following exceptions:—

Leaves elongate, linear-lanceolate, denticulate, acuminate, 5–6 in. long. Involucral scales $\frac{1}{6}$ in. long	1. *N. vernonioides.*
Leaves obovate oblong or oblanceolate, obtuse, toothed or entire, 2–4 in. long. Involucral scales $\frac{1}{20}$–$\frac{1}{12}$ in. long .	2. *N. microcephala.*

1. **N. vernonioides,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 846. Extremities terete, striate, thickness of a goose-quill, tawny-pubescent-tomentose, rather densely leafy. Leaves elongate- linear-lanceolate, acute, callous-denticulate, more or less tawny-pubescent on both sides, narrowed into the short winged petiole; 5–6 in. long, $\frac{2}{3}$ to nearly 1 in. broad. Capitula $\frac{1}{4}$ in. diam., in short pubescent-tomentose pedicels, collected in broad dense terminal corymbs $\frac{1}{3}$–$\frac{1}{2}$ ft. diam., somewhat overtopped by the leaves. Involucral scales linear-lanceolate or inner linear, acute, outer pubescent. Receptacle fimbrilliferous, from the much produced irregularly toothed margins of the pits. Ray equalling the tube in diameter, overtopping the style. Ovary thinly pilose. Mature achenes not seen, immature oblong-pyriform, obtusely callus-pointed at base, more or less compressed.—A. Rich. Fl. Abyss. i. p. 384.

Nile Land. Abyssinia, *Schimper!*

A doubtful member of the genus, not recognised from elsewhere. Perhaps a congener of *Conyza hypoleuca,* Rich. We presume *Erigeron vernonioides,* Sch. Bip. in Schw. and Asch. Enum. 285, from Abyssinia, is the same plant.

2. **N. microcephala,** *Steetz in Peters Mossamb. Bot.* p. 406. Stem erect, from a woody base, with ascending branches above, striate, hirsute or pubescent. Leaves oblanceolate or oblong obovate-oblong, entire or denticulate or more or less coarsely dentate-serrate, obtuse, mucronate, membranous, thinly pubescent or puberulous; upper sessile, auriculate-amplexicaul, lower narrowed into a broadly winged petiole, 2–4 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. wide. Capitula very small, orange-coloured, campanulate, at length hemispherical, $\frac{1}{20}$ to $\frac{1}{12}$ in. long, on short pedicels in dense cymes, collected in ample terminal corymbiform panicles. Involucral scales pauciseriate, linear, acute, glabrous or nearly so, 1-nerved. Receptacle naked. Anther-base obtuse. Ligule elliptic or obovate, equalling or exceeding the style. Achenes compressed, thinly pilose.—*N. membranifolia,* Steetz, *l. c.* 400.

Mozamb. Distr. Cabaceira and Sena, *Dr. Peters!* Shupanga and Shire valley, *Drs. Kirk! and Meller!* M'geta, Zanzibar, *Speke and Grant!*

Nearly allied to *N. auriculata*, DC. of the Cape.

22. **CONYZA**, Less.; Benth. et Hook. f. Gen. Pl. ii. p. 283.

Capitula heterogamous, disciform; outer florets ♀ 2–∞-seriate, of disk all or most hermaphrodite. Involucre campanulate; scales 2–∞-seriate, imbricate, narrow-linear or lanceolate, outer smaller. Receptacle plane or convex, naked or foveolate and fimbrilliferous. Corolla of ♀ florets filiform, narrow-tubular, ligule 0 or minute; of ☿ florets tubular, slightly dilated above, 5-toothed. Anther-base obtuse, entire. Style-branches usually narrow, with lanceolate appendix. Achenes small, compressed. Pappus 1-seriate (or rarely 2-seriate).—Herbs or more rarely shrubs. Leaves alternate, entire dentate or pinnatifid. Capitula small or of medium size, usually cymose corymbose or variously panicled, yellowish (or outer florets whitish).

A considerable weed-like genus widely diffused throughout the warmer regions of both hemispheres. Most of the following species are peculiar to this Flora.

Ligule of ♀ florets obsolete. Leaves (upper) amplexicaul.
- Scales of involucre narrow, linear-lanceolate, acute, greenish, usually about $\frac{1}{16}$ in. broad.
  - Leaves glabrous, finely acuminate . . . . . 1. *C. persicæfolia.*
  - Leaves usually more or less hairy, not narrowly acuminate.
    - Leaves entire, dentate or loosely pinnatifid.
      - Heads usually $\frac{1}{4}$–$\frac{1}{3}$ in. diam.
        - Shrubby, spinose . . . . . 2. *C. spinosa.*
        - Unarmed herbs.
          - Shortly hirsute. Leaves oblong or ovate-lanceolate, toothed or entire . . . . 3. *C. Hochstetteri.*
          - Setulose or glabrate. Leaves ovate or ovate-lanceolate, narrowed below middle, serrate . . . . . 4. *C. Steudelii.*
          - Puberulous or glabrate. Leaves oblanceolate or linear, toothed . . . . . 5. *C. abyssinica.*
          - Puberulous. Leaves linear or spathulate-oblong, entire. . . . . 6. *C. Vatkeana.*
      - Heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam. Leaves toothed or pinnatifid.
        - Pedicels short. Achenes thinly pubescent . . . . . 7. *C. ægyptiaca.*
        - Pedicels ranging up to $1\frac{1}{3}$ in. Achenes glabrous . . . . . 8. *C. senegalensis.*
    - Leaves lanceolate, amplexicaul, acutely incised . . 9. *C. pectinata.*
- Scales of involucre oblong or lanceolate, often purplish., $\frac{1}{12}$ in. broad more or less.
  - Tufted herb of 1–2 in. Inner involucral scales acuminate. Achenes pilose . . . . . 10. *C. nana.*
  - Herb of $\frac{1}{4}$–$\frac{1}{2}$ ft. Involucral scales not acuminate, pubescent. Achenes pilose . . . . . 11. *C. variegata.*
  - $\frac{1}{2}$–2 ft. Involucral scales obtuse, pubescent. Achenes glabrate . . . . . 12. *C. Gouani.*
  - 1–2 ft. or more. Involucral scales acute or acuminate, pubescent. Achenes shining, glabrate 13. *C. clarenceana.*
  - Slender, 2 ft. or more. Involucre glabrous, scales

obtuse or acute, often toothed at tip. Achenes shining . . . . . 14. *C. tigrensis.*
Ligule of ♀ florets obsolete. Upper leaves petiolate.
Petioles winged. Receptacle pitted . . . . . 15. *C. Newii.*
Ligule of ♀ florets present. Leaves usually not amplexicaul.
Leaves distinctly petiolate . . . . . 16. *C. Heudelotii.*
Leaves sessile or with short winged petioles.
Leaves white-tomentose beneath.
Leaves glabrous above, serrulate . . . . . 17. *C. hypoleuca.*
Leaves tomentose above, revolute, with one or two strong lateral teeth . . . . . 18. *C. incana.*
Leaves pubescent, hispid or scabrid, green beneath.
Leaves oval or lanceolate, entire or distant-toothed. Heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. . . . . 19. *C. pyrrhopappa.*
Leaves linear, toothed or pinnatifid. Heads $\frac{1}{5}$ in. diam., in dense cymes . . . . . 20. *C. stricta.*

Of *Conyza fastigiata*, Willd.; DC. Prodr. v. 381, we have not seen tropical African specimens. *C. dongolensis*, Del.; DC. l. c. 388, described from very imperfect material, is unknown to us.

Conyza Kotschyi, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 284, name only, non Boiss., from Nubia, Kordofan and Bahr-el-Abiad, is *Vicoa auriculata*, Cass.

1. **C. persicæfolia,** *O. & H.* Extremities thickness of crow-quill, terete, striate, glabrous. Leaves elongate linear-lanceolate, finely acuminate, tapering below to the narrowly caudate subauricled sessile base, minutely denticulate, glabrous, finely tomentose beneath, 3–5 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. broad. Capitula widely campanulate, ∞-flowered, on short slender unequal glabrous or puberulous pedicels, in terminal divaricate corymbs, varying to $\frac{1}{4}$–$\frac{3}{4}$ ft. diam. Scales of involucre at length spreading, $\frac{1}{8}$ in. long, linear-lanceolate, acuminate, glabrous or nearly so, few outer shorter. Receptacle convex, shallow-foveolate, with denticulate margins. Ray obsolete. Achenes glabrous. Pappus subrufous.—*Erigeron persicæfolium*, Benth. Fl. Nigr. 430.

Upper Guinea. St. Thomas, *Don!* Abbeokuta, *Irving!*

2. **C. spinosa,** *Schultz Bip. mss. in Hb. Berol.* Closely branched spinous shrub, 3–4 ft. high; older branches terete, glabrate, leafless; extremities leafy, terete, puberulous, armed with puberulous forking spines. Leaves linear or narrowly spathulate, entire or tridentate, strigulose, $\frac{1}{3}$–$\frac{1}{2}$ in. long, narrowed below, subamplexicaul. Capitula widely campanulate, many-flowered, $\frac{1}{2}$–$\frac{1}{3}$ in. wide, on short peduncles, few together at the ends of the branches. Scales of involucre linear-lanceolate, subacute, pauciseriate, appressedly hairy on the back, scarious on the margins, about $\frac{1}{20}$ in. wide. Receptacle elevated; centre alveolate, margins toothed. Ray-florets filiform; ligule 0. Anther-base bidentate; tip ovate-oblong. Achenes compressed, with few scattered hairs or glabrous. Pappus uniseriate, sordid.—*Erigeron spinosus*, Schultz Bip. in Schweinf. Fl. Æthiop. i. p. 148.

Nile Land. Abyssinia, 9,000–10,000 ft. alt. *Schimper!*

3. **C. Hochstetteri,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 162. Stock creeping or prostrate, branched; branches herbaceous, erect

or ascending, ¼–2 ft. high, simple or somewhat branched, subterete, striate, shortly hirsute (except in *var. glabra*). Leaves oblong-lanceolate or narrowly elliptic, or lower ones oblanceolate, acute or obtuse, sessile, clasping and auriculate-cordate or lower ones gradually narrowed into a more or less winged clasping petiole, membranous, hirsute, dentate or subentire, usually 1–2 in. long by ¼–½ in. wide, ascending. Capitula widely campanulate, at length hemispherical, ⅓ in. diam., shortly pedicellate in dense globose terminal cymes about 1 in. diam. Scales of involucre pauciseriate, narrowly linear-lanceolate, rather acute, green and pubescent on the back, with scarious margins; outer shorter. Receptacle convex, constricted at base, ⅙–⅛ in. wide, naked, at length minutely tubercled. Ligule obsolete; mouth papillose. Anther-base minutely bidentate. Achenes shortly and appressedly pilosulous. Pappus minutely scabrid, nearly white.—A. Rich. Fl. Abyss. i. p. 387; *Erigeron Hochstetteri*, Sz. B. ex Schweinf. Fl. Æthiop. p. 147.

Nile Land. Abyssinia, *Schimper!* Local name *Adde.*

A. Richard, *l. c.*, makes a plant from the province Ouodgerate, consisting of larger and nearly glabrous specimens collected by Dr. Ant. Petit, into a *var. glabra.*

Closely allied, as pointed out by Vatke in Linnæa xxxix. p. 518 (1875), to the Indian *C. veronicæfolia*, Wall., from which it differs by less coarsely toothed leaves.

4. **C. Steudelii,** *Schultz Bip. in Hb. Schimp. Abyss.* Sect. ii. 561 and 1128. Erect sparingly branched annual of 1½–3 ft.; stem terete, striate, thinly setulose pubescent or glabrate, leafy to the top. Leaves ovate or lanceolate, acute, apiculate; upper sessile, ovate-lanceolate, base cordate and amplexicaul, lower narrowed below the middle or suddenly contracted into a winged auricled and clasping petiole, membranous, serrate-dentate, with mucronate teeth, scabrid or subglabrate, 1–4 in. long, ½–1½ in. broad. Capitula at length hemispherical, ¼–⅓ in. broad, in small dense rounded pedunculate or subsessile cymes, 1–2 in. diam. Scales of involucre pauciseriate, linear-lanceolate, acute, 1-nerved, green, pilose, with scarious margins. Receptacle convex, constricted at base, foveolate towards the centre, with toothed margins to the pits. Ligule obsolete. Anther-base obtuse. Achenes thinly very minutely appressed-pubescent. Pappus connate at base in minute ring.—A. Rich. Fl. Abyss. i. 388; *Erigeron Steudelii*, Sz. B. ex Schweinf. Beitr. Fl. Æthiop. p. 148.

Nile Land. Abyssinia, 8–9,000 ft. alt., *Schimper!*

5. **C. abyssinica,** *Schultz Bip. in Hb. Schimp. Abyss.* Sect. i. n. 195. Ascending branched herb, 2 ft. high. Branches terete, striate, puberulous, leafy. Leaves narrow-oblanceolate or the upper linear, apiculate, somewhat narrowed to an auricled-cordate sessile base, coarsely and distantly toothed, scaberulous, 1–2½ in. long by ⅛–½ in. wide; teeth apiculate; veined beneath. Inflorescence puberulous. Capitula campanulate, ¼–⅓ in. diam., on short slender pedicels, in subcorymbose terminal panicles, 4–6 in. wide. Scales of involucre pauciseriate, linear-lanceolate, acute, puberulous and glandular on exposed parts on back. Receptacle convex, tuberculate, glabrous. Hermaphrodite florets 2 or more. Anther-base obtuse. Female florets; ligule

obsolete; tube with a few scattered setiform papillæ. Achenes thinly pilose. Pappus uniseriate, barbellate, tawny.—A. Rich. Fl. Abyss. i. p. 390; (?) *Erigeron abyssinicus*, Schultz Bip. ex Schweinf. et Asch. Enum. 284 (name only).

Nile Land. Abyssinia, *Schimper!* Abyssinian name *Gursaï.*

6. **C. Vatkeana,** *O. & H.* Divaricately branched, puberulous, herbaceous above. Branches striate, slightly flexuous above. Leaves (upper) linear or spathulate-oblong, obtuse, mucronate, sessile, amplexicaul, scarcely auriculate at the base, entire, ranging up to $1\frac{1}{3}$ by $\frac{1}{4}$ in. Heads nearly hemispherical, $\frac{1}{5}$ in. diam., without rays, on slender pedicels ranging up to $\frac{1}{2}$ in., numerous, in ample corymbose paniculate cymes. Involucral bracts narrowly lanceolate-subulate, taper-pointed, puberulous, not purplish. Pappus somewhat sordid.—*C. macrorhiza*, Vatke, part, in Linnæa, 1875, p. 483; non Schultz Bip.

Nile Land. Abyssinia, *Schimper!* Among bushes, alt. 5,000 ft., 14th Sept. 1862. Tigré name *Subhinăday.*

7. **C. ægyptiaca,** *Ait.; DC. Prodr.* v. p. 382. Annual or biennial, erect, branched, $1\frac{1}{2}$–3 feet high, hirsute or pilose with spreading hairs. Stem terete, striate. Leaves linear-oblong or oblong-spathulate, coarsely toothed, pinnatifid or subentire, obtuse or acute, sessile, amplexicaul or auriculate at the base, pilose or hirsute on both sides, 1–4 in. long by $\frac{1}{10}$–1 in. wide. Capitula hemispherical, many-flowered, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., on unequal and variable usually short pedicels in lax corymbose or elongated terminal and axillary panicles. Scales of involucre pauciseriate, linear, acuminate, nearly equal, pubescent, ultimately reflexed. Receptacle at first alveolate, more or less fimbrilliferous, convex, at length constricted at base. Ligule of ray-florets obsolete. Achenes thinly pubescent. Pappus tawny or nearly white.—*C. lineariloba*, DC. *l. c.* p. 385; *Erigeron ægyptiacum*, L.; *C. dentata* (Willd. ?) DC. *l. c.*; *C. echioides*, A. Rich. Fl. Abyss. i. p. 388.

Upper Guinea. Senegal, *Perrottet! Roger! Richard!* Sierra Leone, *Afzelius!*
North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. Abyssinia, *Schimper!* and others; Gallabat, *Schweinfurth!* Unyoro (590), *Speke and Grant!* Niamniam-land, and White Nile, *Schweinfurth!* Cordofan, *Kotschy!*
South Central. Region about Lake Tanganyika, *Cameron!*
Mozamb. Distr. (Form with longer leaf-segments) Moramballa, *Dr. Kirk!*

Erigeron exstipulatum, Schum. et Thonn. Guin. Pl. 387, is given by DC. as a synonym of C. dentata, but with a mark of doubt.

Extends eastward through India to China and Australia. Very variable in the depth and breadth of the leaf-lobes.

8. **C. senegalensis,** *Willd. Sp. Pl.* iii. p. 1928. Erect branched herb, a foot and a half high or more. Stem and branches striate, pubescent. Leaves obovate or oblong, membranous, pubescent, toothed, ranging up to 2 in. long; the upper ones sessile, amplexicaul, often auriculate at the base. Capitula hemispherical, $\frac{1}{2}$–$\frac{3}{5}$ in. diam., on pubescent pedicels ranging up to $1\frac{1}{3}$ in., which are slender in flower but become more robust in fruit, arranged in a corymbose leafy cyme. In-

volucral scales in about 4 rows, more or less pubescent and scattered with small glands at the back, linear-lanceolate, acute, narrow; the inner ones subscarious, the outer smaller, green. Ligule 0. Receptacle depresso-convex, $\frac{1}{5}$ in. diam., punctate, not alveolate. Achenes glabrous. Pappus white or nearly so.—Sieber Fl. Seneg. Exsicc. n. 42; *Blumea senegalensis*, DC. Prodr. v. p. 449; *B. guineensis*, β. *foliolosa*, DC. *l. c.*; *B. aurita*, γ. *mossambiquensis*, Steetz in Peters Mossamb. Bot. p. 437.

Upper Guinea. Senegambia, *Rousillon! G. Don! Sieber!*
Mozamb. Distr. Sena, *Peters!*

9. **C. pectinata,** *Schultz Bip. mss. in Hb. Berol.* Branches terete, obscurely sulcate, puberulous with fine spreading pale hairs, leafy. Leaves (upper) lanceolate, acute, sessile, subamplexicaul at base, incise-pinnatifid, with linear-lanceolate patent or arching teeth, thinly hirsute or scabrid, midrib beneath prominent, $1\frac{1}{2}$–2 in. long by $\frac{1}{3}$–$\frac{1}{2}$ in. wide. Capitula hemispherical, many-flowered, $\frac{3}{8}$–$\frac{1}{2}$ in. diam., on pedicels $\frac{1}{3}$–$\frac{2}{3}$ in. long, in lax corymbose terminal cymes. Scales of involucre pauciseriate, linear-lanceolate, acute, glandular and hispidulous, $\frac{1}{20}$ in. wide or narrower. Receptacle glabrous, tuberculate, $\frac{1}{10}$–$\frac{1}{7}$ in. wide, discoid, much constricted at base. Ray-florets filiform; ligule obsolete; tube thinly pilose above. Anther-base bidentate; tip oblong-lanceolate. Achenes compressed, thinly hairy, with ascending hairs, oblique at apex. Pappus uniseriate, scabrid, sordid.—*Erigeron pectinatus*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. i. p. 147.

Nile Land. Abyssinia, 8,000 ft. alt., *Schimper!*

10. **C. nana,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 1170. Perennial, cæspitose, dwarf herb, scarcely 1 in. above the ground. Stems short, concealed by leaves, pilose-tomentose. Leaves crowded, upper linear-oblong or -spathulate, denticulate or entire, scabrid-pubescent, $\frac{1}{3}$–$\frac{2}{3}$ in. long; radical spathulate, elongate-attenuate at base, glabrous or nearly so, $\frac{2}{3}$–$1\frac{1}{3}$ in. long. Capitula campanulate, $\frac{2}{5}$ in. wide, many-flowered, solitary, subsessile, terminal. Scales of the involucre pauciseriate, lanceolate, acuminate, pubescent; margins and tips purple, 3-nerved. Receptacle depresso-convex, constricted at base, foveolate. Ligule of ray-florets rudimentary, papillose-laciniate. Anther-base minutely bidentate. Achenes (immature) compressed, pilose. Pappus pale tawny.—*Erigeron nanus*, Sz. Bip. in Schweinf. et Asch. Enum. 284.

Nile Land. Abyssinia, *Schimper!*

11. **C. variegata,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 1385. Low often tufted herb of $\frac{1}{4}$–$\frac{1}{2}$ ft., from a perennial stock. Stems simple from base, pubescent. Radical leaves elliptical or oblong-elliptical, obtuse, long-petiolate, cauline from ovate-lanceolate to oblong or narrow-oblanceolate, sessile, uppermost amplexicaul, all pauciden-tate, broadly pointed or obtuse, mucronulate, thinly hispid; lamina of radical leaves 1 in. more or less long. Capitula campanulate, $\frac{1}{4}$ in. diam., many-flowered, on very short hairy pedicels, or sessile 3–8 toge-

ther, forming close terminal clusters. Involucral scales appressed, oblong-lanceolate, acute or subacute, pubescent, usually purple towards the apex and margin. Receptacle foveolate, with obtusely lobed margins to the pits. Ligule of ray-florets obsolete; mouth papillose. Achenes sparsely shortly pilose. Pappus pale tawny.—A. Rich. Fl. Abyss. i. p. 388; *Erigeron variegatus*, Sch. Bip. in Schweinf. et Asch. Enum. p. 285; *C. Hochstetteri*, Schultz Bip. δ. *montana*, Vatke in Linnæa xxxix. p. 518 (1875).

Nile Land. Abyssinia, *Schimper!*

12. **C. Gouani,** *Willd.; DC. Prodr.* v. p. 380. Erect or ascending herb, ½–2 ft. high. Stem striate, shortly pubescent or glabrate, branched above. Leaves linear- or oblong-lanceolate narrow-elliptical or oblanceolate, more or less acute, rounded and amplexicaul at the base, sessile, serrulate or subentire, subglabrous, ½–4 in. long, ⅙–½ in. broad. Capitula hemispherical, ⅖ in. diam., many-flowered, on unequal pedicels, sometimes 1 in. long, in terminal corymbose cymes. Scales of involucre sub-biseriate oblong or narrow-elliptical, obtuse, shortly pubescent; margins and apex broadly scarious. Receptacle convex, at length constricted at base, closely tuberculate. Ligule obsolete. Achenes glabrous. Pappus tawny.—*Erigeron Gouani*, L. *C. gnaphalioides*, Sch. Bip. in Hb. Schimp. Abyss. sect. i. n. 342; A. Rich. Fl. Abyss. i. p. 389.

Nile Land. Abyssinia, *Schimper!* Abyssinian name *Kasch Kăscho.*
Also in the Canary Islands.

13. **C. clarenceana,** *O. & H.* Herbaceous, erect, stiff, 1–2 ft. high. Branches subterete, hispid. Leaves linear-lanceolate, acute, apiculate, rounded and amplexicaul at the sessile base, distantly apiculate-serrulate, hispid, 1–4 in. long by ¼–⅔ in. wide. Capitula hemispherical, ½ in. wide, many-flowered, on unequal pilose-tomentose short pedicels, in congested about 12-headed globose terminal cymes 1–2 in. diam. Scales of the involucre oblong or lanceolate, acute or acuminate, with wide membranous purple margins, pubescent on the back; outer rather shorter. Receptacle depresso-convex, constricted at base, naked. Ligule of ray-florets obsolete. Achenes glabrous or with few minute hairs, shining, pale. Pappus pale tawny.—*Vernonia clarenceana*, Hook. f. in Journ. Linn. Soc. vi. p. 11.

Upper Guinea. Fernando Po, 7500–8500 ft. alt., *Mann!*
Var.? *abyssinica.* Leaves broader towards the base, dentate-serrate,
Nile Land. Abyssinia, *Schimper!*

14. **C. tigrensis,** *O. & H.* Erect, often slender, herb, unbranched or with weak ascending branches above, 1–3 ft. high. Stem striate, thinly pubescent or setulose. Leaves ovate or ovate-oblong or lanceolate, obtuse or acute, upper sessile, broad and amplexicaul at base, lower petiolate, broadly dentate or subentire, thinly hispid or glabrate, with pale midrib and veins beneath, ⅓–1½ in. long, or 3 times larger in luxuriant specimens. Capitula ¼–⅓ in. wide, shortly pedicellate, in pedunculate loosely panicled clusters or congested heads. Scales of involucre lax or divergent, elliptic- or lanceolate-oblong, obtuse often

denticulate at apex or acute, green or more or less crimson or purple, glabrous. Receptacle narrow, convex, constricted at base, alveolate, tuberculate, glabrous. Ligule of ray-florets obsolete. Anther-base obtuse, unappendaged. Achenes pale, shining, with few appressed microscopic hairs. Pappus white.—*Erigeron echioides*, Schultz Bip. (non *Conyza echioides*, A. Rich.), in Schweinf. Beitr. Fl. Æthiop. p. 146; *C. variegata*, Schultz Bip., *β. pratensis* and *γ. silvestris*, Vatke in Linnæa xxxix. p. 483.

Nile Land. Abyssinia, 1853, No. 673, and (1863) 1123, 1124, *Schimper !*

15. **C. Newii,** *O. & H.* Extremities terete, puberulous or puberulous-tomentose, with loose short patent hairs on the peduncles and pedicels. Leaves alternate, oval-oblong or oblong-lanceolate, acute, narrowed to the winged petiole, acutely serrate, glabrescent above, thinly hairy beneath, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long. Capitula $\frac{1}{4}$ in. diam., on pedicels of $\frac{1}{4}$–$\frac{1}{2}$ in., in terminal corymbs 2–3 in. broad. Involucral scales submembranous, subequal; outer elliptic or elliptic-lanceolate, subacute, pubescent; inner oblanceolate or oblong. Receptacle pitted, pits with toothed or fimbrilliferous margins. Corolla of ray-florets tubular, much shorter than style, with long loose papillæ at the mouth: of ☿ florets divided $\frac{1}{3}$ of its length. Anther-base bidentate. Achenes compressed; setæ of pappus cohering in basal annulus.

Mozamb. Distr. Kilima-njaro, *Rev. C. New !*

16. **C. Heudelotii,** *O. & H.* Herbaceous? Branches terete, striate, puberulous. Leaves ovate, shortly acuminate, acute, slightly narrowed at base, distantly denticulate, glabrate above, shortly tomentellous beneath, petiolate, (upper) about $2\frac{1}{4}$ in. long by 1 in. wide; lateral arching veins and net-veins delicately marked beneath; margins slightly reflexed; petioles about $\frac{1}{3}$ in. long, somewhat dilated at base. Capitula campanulate, many-flowered, $\frac{1}{6}$–$\frac{1}{5}$ in. long, on short pedicels, in dense branched corymbose cymes 1–3 in. diam. Scales of involucre multiseriate, imbricated, obtuse; inner linear, glabrous; outer oval-oblong, puberulous, successively shorter. Receptacle narrow, plano-convex, scarcely naked. Ray-florets ligulate; ligule about equalling pappus. Achenes shining, scattered with minute setæ. Pappus reddish, scabrous.—*Pluchea subumbellata*, Klatt in Ann. Sc. Nat. Sér. v. vol. xviii. 369.

Upper Guinea. Senegambia, *Heudelot !*

17. **C. hypoleuca,** *A. Rich. Fl. Abyss.* i. 391. Shrubby. Branches terete, white-tomentose, leafy. Leaves lanceolate or linear-lanceolate, acute or obtuse, mucronulate, narrowed at base into a short winged petiole, serrate, subcoriaceous, white-tomentose beneath, glabrous above, $1\frac{1}{2}$–3 in. long by $\frac{1}{3}$–$\frac{3}{4}$ in. wide. Capitula subglobose, $\frac{1}{5}$ in. diam., on unequal pedicels ranging up to $\frac{1}{5}$ in. long, in dense corymbose terminal cymes 2 in. wide. Scales of the involucre 3–4-seriate, thinly pubescent, ciliate, acute, inner linear-lanceolate, outer lanceolate, shorter. Receptacle with filiform fimbrillæ towards the centre. Ray-florets with a distinct minute 2–3-dentate oblong ligule. Achenes

slightly pubescent. Pappus sordid.—*Erigeron hypoleucus*, Schultz Bip. in Schweinf. et Asch. Enum. 284.

Nile Land. Abyssinia, *Petit!*

18. **C. incana,** *Willd.; DC. Prodr.* v. p. 388. Shrubby below, hoary-tomentose, 1–2 ft.; branchlets terete, leafy above. Leaves scattered, linear, often with 1–2 prominent lateral teeth, apiculate or strongly mucronate, sessile, $\frac{1}{2}$–1 in. long, margins strongly revolute. Capitula campanulate, $\frac{1}{5}$ in. long, many-flowered, shortly pedicelled, in dense corymbose or globose terminal cymes 1–2 in. wide. Scales of the involucre linear, 1-nerved; outer shorter, tomentose subobtuse; inner nearly glabrous, acute. Receptacle convex, narrow, constricted at base, shallow-foveolate, with denticulate margins to the pits. Ligule of ray-florets equalling the tube in diameter and about $\frac{1}{4}$–$\frac{1}{3}$ of its length, 2–3-dentate. Achenes pubescent, at least when young. Pappus tawny.—*Erigeron incanum*, Vahl, Symb. i: 72; *C. leucophylla*, Schultz Bip. in Hb. Schimp. Abyss. ii. 1097,1295; A. Rich. Fl. Abyss. i. p. 386; *Erigeron leucophyllus*, Schultz Bip. in Schweinf. Fl. Æthiop. i. 147.

Nile Land. Abyssinia, *Schimper!*

19. **C. pyrrhopappa,** *Sch. Bip. in Hb. Schimp. Abyss.* sect. i. 10. Herb, probably several feet in height; branches terete, striate, scabrid-pubescent or -puberulous. Leaves narrow-elliptical or -oblanceolate, acute or at least mucronate, narrowed to a sessile narrow base or petiole narrowly winged, entire or with 2–4 apiculate large distant teeth on each side, scabrous above, pubescent beneath, 1–3 in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad. Capitula campanulate, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, at length more or less divergent, on short slender pedicels in often rather dense corymbose panicled clusters, together $\frac{1}{3}$–1 ft. across. Involucral scales linear-lanceolate acute, pubescent and sessile-glandular on the back; outer shorter. Receptacle minutely tubercled. Ligule equalling the tube in width, usually shorter than the style, often bidentate. Anther-base obtuse. Achenes compressed, hairy. Pappus 1-seriate, barbellate, reddish or tawny.—A. Rich. Fl. Abyss. i. 389. *Erigeron pyrrhopappus*, Sch. Bip. ex Schw. Fl. Æthiop. p. 147.

Nile Land. Abyssinia, *Schimper!*
Abyssinian name *Tanketam.*

20. **C. stricta,** *Willd. Sp. Pl.* iii. p. 1922. Erect herb, woody below, of 1–2 ft. or frutescent, branched and leafy above; branches shortly pubescent, terete, striate. Leaves linear-spathulate, pinnatifid or dentate, apex and lobes usually mucronulate, hispid-pubescent, sessile, clasping at base, $\frac{1}{2}$–1 in. long. Capitula widely campanulate, many-flowered, $\frac{1}{6}$–$\frac{1}{5}$ in. high, $\frac{1}{5}$ in. wide, on short slender pedicels, in dense corymbose cymes. Scales of involucre linear-lanceolate, 1-nerved, pubescent outside, more or less acute. Receptacle globose, foveolate, naked, narrow. Ray-florets with a linear ligule equalling the tube in length and breadth, shorter than the style, sometimes obsolete. Anther-base obtuse. Achenes somewhat pubescent. Pappus tawny or subrufous.—*Erigeron Schimperi*, Schultz Bip. in Schweinf. Fl. Æthiop.

147. *C. Schimperi*, Schultz Bip. in Pl. Schimp. Abyss. sect i. n. 124. *C. absinthifolia*, DC. Prodr. v. p. 383. *C. macrorrhiza*, Schultz Bip. in Pl. Schimp. Abyss. sect. ii. n. 1104. *E. macrorrhizus*, Schultz Bip. in Schweinf. Fl. Æthiop. 147. Cfr. *C. spathulifolia*, Maxim. in Regel, Descr. Pl. Nov. ii. p. 13 (1874).

North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. Abyssinia, *Schimper! Roth! Hildebrandt!*
Mozamb. Distr. Kilima-njaro, *Rev. C. New!*
Extends to India.

23. **PSIADIA,** Jacq.; Benth. et Hook. f. Gen. Pl. ii. p. 284.

Capitula heterogamous radiate, ray-florets ♀ in several series, disk-florets fewer staminate. Involucre campanulate, scales ∞ -seriate, ovate to linear, outer smaller, imbricate. Receptacle naked. Corolla of ray ligulate, ligule small, entire or 2–3-dentate; of disk tubular 5-toothed. Anther-base obtuse, 2-dentate. Achenes 3–6-costate, but slightly or not compressed, base narrowed callous; setæ of pappus 1-seriate.—Glabrous, often with more or less viscid extremities, (villous or hirsute) shrubs. Leaves alternate, entire or toothed. Capitula small or of medium size, in terminal corymbs. Ray-florets yellow.

A small genus chiefly confined to the Mascarene Islands.

Nearly glabrous. Ligule small.	
Leaves lanceolate acuminate or cuspidate	1. *P. arabica.*
Leaves oval-oblong, obtuse, mucronate	2. *P. dodonææfolia.*
Hoary-tomentose. Ligule of the ray-florets conspicuous .	3. *P. incana.*

1. **P. arabica,** *Jaub. et Spach, Illustr. Plant. Orient.* iv. p. 85, tt. 352, 353. A branched shrub ranging up to 6 ft. or more. Branchlets glandular-puberulous or glabrate. Leaves lanceolate, more or less acuminate or cuspidate, narrowed at the base into the petiole, entire or distantly serrulate, subcoriaceous, 2–3 in. long, the younger ones resinous-glistening and marked with minute glandular dots; margins undulate or flat; midrib depressed above, prominent beneath; lateral veins not conspicuous; petiole ranging up to ½ in. Capitula 35–75-flowered, hemispherical, ¼–⅓ in. diameter, on pedicels ranging up to ½ in., in many-headed corymbose cymes, equalling or rather overtopping the leaves. Involucral scales 3–5-seriate, subcoriaceous, puberulous or glabrous, obtuse. Ligule small, entire or 2–3-dentate. Flowers yellow.—*P. resiniflora*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. pp. 286, 308; *Nidorella punctulata*, DC. Prodr. v. p. 323; *P. punctulata*, Vatke in Oesterr. Bot. Zeitsch. xxvii. 196 (1877).

Nile Land. Abyssinia, *Schimper! Hildebrandt! Beccari*; Somali-land, *Hildebrandt.*

Mozamb. Distr. *Zanzibar, Kirk!*
Occurs also among the mountains of Yemen in Tropical Arabia, and also among the Asbestos Mountains in the Kalahari district of South Africa; it is very nearly related to, if not identical with, a species from Madagascar.

2. **P. dodonææfolia,** *Steetz in Peters Mossamb. Bot.* p. 385. A shrub. Branchlets short, leafy and slightly puberulous at the extremities. Leaves oval-oblong, obtuse and mucronate at the apex, narrowed at the base into the petiole, entire, glabrous, 1½–2½ in. long,

subcoriaceous; midrib depressed above, prominent beneath; lateral veins not conspicuous; margins narrowly revolute, not undulate; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. Capitula $\frac{1}{5}$ in. diameter, hemispherical, 60–70-flowered, on short pedicels, in corymbose cymes scarcely equalling the leaves. Involucral scales 3–4-seriate, obtuse; the outer ones puberulous, subcoriaceous. Ligule small, bidentate.

Mozamb. Distr. Mozambique, *Peters!*

Perhaps only a form of the former species.

3. **P. incana,** *O. & H.* A densely-branched hoary shrub, a yard high or more. Branchlets scattered with a white puberulence. Upper leaves oval or obovate obtuse or pointed, wedge-shaped at the base into a short petiole, shortly hoary-tomentose, especially beneath, crowded on the young shoots, entire, $\frac{1}{2}$–1 in. long. Heads $\frac{1}{4}$ in. long, on hoary-pubescent pedicels of $\frac{1}{6}$–$\frac{1}{3}$ in. in dense terminal hemispherical corymbs, overtopping the leaves. Outer bracts of the involucre woolly outside, ovate, obtuse; inner rather oblong, nearly glabrous, $\frac{1}{12}$ in. long. Ligule of the ray-florets $\frac{1}{8}$ in. long, longer than the style branches.

Nile Land. Somali-land, in mountainous places, at 3300–5300 ft. altitude, *Hildebrandt!*

24. ADELOSTIGMA, Steetz; Benth. et Hook. f. Gen. Pl. ii. 285.

Capitula heterogamous, many-flowered. Involucral scales ∞, imbricate, elongate, lanceolate or linear. Outer florets pistillate, pluriseriate; inner florets few or solitary, tubular, hermaphrodite (or sterile?). Receptacle plane, alveolate. Corolla of outer fl. filiform, mouth 3–4-dentate; of disk-fl. dilated towards the 5-lobed mouth. Anther-base 2-dentate or sagittate. Style papillose above, scarcely or very shortly bifid at apex. Achenes cylindrical; pappus 1-seriate, setaceous.—Annual erect herbs, sparingly branched above. Leaves alternate, linear, entire or pectinate. Capitula $\frac{3}{4}$–1 in. diam., solitary, terminal.

Peculiar to this Flora.

Leaves pinnatipartite. Capitula surrounded by floral leaves . . 1. *A. senegalensis.*
Leaves entire or denticulate. Capitula without outer floral leaves . . . . . 2. *A. athrixioides.*

1. **A. senegalensis,** *Benth. in Hook. Ic. Pl.* 1144. Glabrous erect annual herb of 1–1½ ft. more or less, branched above, each branch terminating in a capitulum; stem and branches terete with raised decurrent lines or very narrowly alate from the leaf-bases. Leaves linear, remotely pectinate-pinnatipartite, varying to 2 in. in length, rachis and lobes $\frac{1}{2}$ line broad or narrower. Capitula terminal, $\frac{1}{2}$–1 in. diam., often corymbose, surrounded by the upper leaves which lose their lateral lobes and pass gradually into the involucre. Involucral scales linear-lanceolate, long-acuminate, 1-nerved, outer tomentose at least below, inner scales lanceolate-subulate hyaline. Pistillate florets very numerous; corolla easily separating, filiform-tubular, mouth minutely unequally (4-) dentate. Style-branches slender, elongate.

Staminate florets 1 or few, 5-toothed; anther-base bidentate. Style undivided, strongly papillose from the tip downwards. Achenes oblong, obtusely angular, clothed with erect stiffish hairs; basal callus white; setæ of pappus 12–24, faintly cohering at base.—*Cancellaria senegalensis*, Sch. Bip. ms. in Hb. Cosson.

Upper Guinea. Senegambia (flowers rose-coloured), *Heudelot!* Sierra Leone, *Afzelius!*

2. **A. athrixioides,** *Steetz in Peters Mossamb. Bot.* 430. Erect annual herb of 1 ft. more or less, with 2 or 3 short leafy branches above, thinly pilose-hirsute. Leaves linear-lanceolate, subacute, mucronulate, narrowed to the base, entire or denticulate, 3 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Capitula solitary, terminal, $\frac{3}{4}$ in. diam., on tawny-pilose erect peduncles. Involucral scales very numerous, narrow-linear-subulate; outer successively shorter; intermediate $\frac{1}{3}$ in. long. Pistillate florets very slender, $2\frac{1}{2}$ lin. long; hermaphrodite florets much larger, traversed by 5 dark purple lines. Achenes 1 lin. long, often slightly curved, clothed with silvery appressed hairs; setæ of pappus 12–16 denticulate.

Mozamb. Distr. Inhambane, *Dr. Peters!*

25. TARCHONANTHUS, Linn.; Benth. et Hook. f. Gen. Pl. ii. 288.

Capitula dicœcious, discoid. Involucre campanulate; bracts 1–2-seriate, herbaceous. Receptacle small, naked. Corolla of ♀ fl. densely woolly. Anther-base sagittate, long tails cohering in pairs. Style ♂ fl. undivided or minutely 2-dentate. Achenes woolly; pappus 0.—Shrubs or small trees with alternate areolate-reticulate leaves and paniculate inflorescence, the ♀ capitula conspicuous owing to the copious woolly investment of the florets.

With the following exception confined to the Cape.

1. **T. camphoratus,** *Linn. Sp. Pl.*, ed. i., 842. A much-branched shrub or a small tree with dark-ashy branches and aromatic smell. Leaves narrowly oval, obtuse or submucronulate at the apex, somewhat narrowed to the shortly petiolate base, entire, very shortly tomentose beneath, subglabrescent and minutely tessellated above, coriaceous, $\frac{2}{3}$–$1\frac{3}{4}$ by $\frac{1}{4}$–$\frac{3}{5}$ in., pale. Capitula campanulate, $\frac{1}{6}$ in. long, very shortly pedicellate, in short racemes forming pyramidal cymes. Female florets 3–5. Achenes very woolly.—Harv. Fl. Cap. iii. p. 118, with synonymy.

Wile Land. Somali, var. *minor, Hildebrandt!* shrub of 9–10 ft., alt. 6600 feet; Abyssinia, *Hildebrandt!* tree of 13 ft.; Abyssinia, *Schimper!*

T. minor, Less.; Harv. l. c. is probably a synonym; also *T. abyssinicus*, Schultz Bip. in Schweinf. Fl. Æthiop. 287.

Occurs also widely spread over the regions of Africa south of the tropic.

It was upon an arborescent species of *Tarchonanthus* that Dr. Welwitsch states that he found growing the only species of the genus *Viscum* which he saw in Angola.

26. **BLUMEA,** DC.; Benth. et Hook. f. Gen. Pl. ii. p. 289.

Capitula heterogamous, many-flowered, disciform; outer florets ♀ numerous, filiform; disk-florets hermaphrodite or sterile. Involucre hemispherical or campanulate; scales pauci- or pluriseriate, usually scarcely rigid, narrow-linear; outer shorter. Receptacle naked. Corolla of ♀ fl. tubular, filiform; ligule 0 or rudimentary; of inner fl. tubular, 5-toothed. Anther-base tailed. Style-branches narrow-linear. Achenes subterete or angular, with basal callus; pappus uniseriate, setiform.—Herbs. Leaves alternate from linear to elliptical or obovate, entire toothed or pinnatifid, often villous or pubescent. Capitula usually hairy in corymbose or congested panicles.

A large weedy genus of the Old World Tropics.

Leaves auricled, often interruptedly decurrent . . . . . 1. *B. aurita.*
Leaves not auricled nor decurrent.
  Softly pubescent at least above. Leaves obovate, attenuate at base . . . . . 2. *B. lacera.*
  Glabrous or puberulous. Leaves linear or oblanceolate, upper rounded and clasping at base . . . . . 3. *B. abyssinica.*

1. **B. aurita,** *DC. Prodr.* v. p. 449. Pubescent or loosely pilose erect herb of 1½–3 ft.; branches striate, leafy. Leaves alternate, membranous; radical obovate or elliptical, unequally broadly toothed or pinnatifid toward the winged petiole; cauline obovate-oblong or oblong, deeply toothed or pinnatifid or lyrate-pinnatipartite, acute or obtuse, sessile and auricled at the base, often interruptedly decurrent in a double series of spreading lobes; 1½–4½ in. long. Capitula campanulate, ⅓–½ in. diam., ∞-flowered on unequal pedicels varying to 1½ in. long, in wide corymbose or diffuse terminal panicles. Scales of involucre pluriseriate, narrowly linear-lanceolate, acutely acuminate; outer ones loose, shorter, densely hirsute with white spreading hairs. Receptacle naked. Ray-florets filiform; ligule 0. Anthers tailed at base, tips ovate-oblong, obtuse. Achenes thinly pilose, obscurely angular, with small perforated callus. Pappus uniseriate, thin, white.—*B. guineensis*, DC. l. c. excl. var. *Erigeron stipulatum*, Schum. et Thonn. Guin. Pl. 385. *Conyza argentea*, Perr. et Lepr. ex DC. l. c. *C. guineensis*, Willd. sp. pl. iii. 1930. *Pluchea Kotschyi*, Schultz Bip.! in Hb. Kotsch. Nubic. n. 345. *Laggera aurita*, Schultz Bip. in Hb. Schimp. Abyss. sect. iii. n. 1769.

Upper Guinea. Senegambia, *Leprieur!* Niger, *Baikie!* Sierra Leone, *Afzelius!*
Nile Land. Abyssinia, *Schimper! Hildebrandt!* Sennaar, *Kotschy!* Nubia, *Kotschy!* Mittu-land, *Schweinfurth!* White Nile, *Petherick! Schweinfurth!*
Occurs also in Egypt, Arabia, Cape Verde Islands, Scinde and India.

2. **B. lacera,** *DC. Prodr.* v. 436. Erect or ascending herb, softly pubescent or in some forms glabrate below, ½–4 ft. high; stem and branches terete, faintly striate. Leaves alternate, obovate or oblanceolate, obtuse, attenuate into the slender petiole, membranous, softly puberulous or glabrescent, dentate or denticulate, 1–5 in. long, ¼–2 in. broad; lower petioles ranging to 2 in. in length. Capitula purplish, widely campanulate, ¼–⅓ in. diam., ∞-flowered, on unequal pedicels

under ½ in. long, in pyramidal or elongate terminal panicles 1–3 in. wide. Scales of involucre pauciseriate, very narrowly linear-lanceolate, acute, pilose with long white loose hairs, inner ones scarious, outer ones rather shorter, ascending. Receptacle naked. Ray-florets ∞, filiform; ligule obsolete; disk-florets 0 or ∞, 5-toothed; anthers tailed, tips obtuse or retuse. Pappus sordid or nearly white, uniseriate, obscurely barbellate. Achenes glabrous or with few scattered hairs above.—*B. dregeanoides*, Schultz Bip. in Hb. Schimp. sect. ii. 633 (slenderer and less pubescent form). *B. runcinata*, Thoms. in Speke and Grant, App. p. 637. *B. Perrottetiana*, DC. l. c. 443. *B. thyrsoidea*, Sch. Bip. in Bot. Zeit. 1866, 166. *Conyza thyrsoidea*, Pers., DC. Prodr. v. 389. *C. amœna*, Link, DC. l. c. 382. *Blumea Wightiana*, DC. l. c. 435. *B. axillaris*, DC. l. c. 434.

Upper Guinea. Senegambia, *Perrottet!* Sierra Leone, *Afzelius!* Niger, *Barter!*
Nile Land. Abyssinia, *Schimper! Petit!* Unyoro, *Speke and Grant!* Gazelle River and Mittu-land, *Schweinfurth!*
Lower Guinea. Congo, *Chr. Smith!*
Mozamb. Distr. Zanzibar, *Hildebrandt!*
Also in Mauritius, Tropical Asia and Australia; a variable plant; the smaller forms often flaccid with slender petioles and remotely denticulate leaves.
B. solidaginoides, DC. Prodr. v. 443, may belong to this species; the description agrees, but we have not seen a specimen.

3. **B. abyssinica,** *Sch. Bip. in Hb. Schimp. Abyss.* ii. n. 1006. Herb, simple or much-branched at stock, glabrous except capitula or puberulous, 1–1½ ft. high; branches decumbent or ascending, terete, glaucescent. Leaves alternate, linear or lower oblanceolate, obtusely pointed or acute, rounded at the sessile clasping base, or lower ones attenuate at base, denticulate or subentire, submembranous, ranging up to 2½ in. long by ⅖ in. wide. Capitula hemispherical, ∞-flowered, ⅓–½ in. diam., on slender unequal pedicels ranging up to 2 in. long, in lax wide corymbose terminal panicles. Scales of involucre subquadriseriate, narrowly linear-lanceolate, acutely acuminate, unequal, pubescent with spreading hairs; outer series successively shorter. Receptacle naked. Ray-florets filiform, tubular; mouth toothed; style much exserted with slender branches. Ligule obsolete or rudimentary, minutely toothed. Anther-base shortly and acutely sagittate. Corolla-teeth setulose. Achenes thinly setulose; callus strong, perforated. Pappus obscurely barbellate, sordid, uniseriate.—A. Rich. Fl. Abyss. i. p. 392. *Conyza Bovei*, DC. Prodr. v. 381. *B. Bovei*, Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 3_4. *Varthemia*, Schultz. Bip. in Hb. Schimp. Abyss. iii., 1568, 1940, ex Vatke in Linnæa, xxxix. p. 485.

Nile Land. Abyssinia, *Schimper! Hildebrandt*; Red Sea, *Lord!*
Occurs also in the Great Oasis, and Arabia, and extends to Affghanistan.

27. **LAGGERA,** Sch. Bip.; Benth. et Hook. f. Gen. Pl. ii. 290.

Capitula heterogamous, many-flowered, disciform; outer florets ♀ numerous, filiform; disk-florets tubular. Involucre campanulate or hemispherical; scales ∝-seriate, usually rather rigid, the outer frequently recurved, ovate-lanceolate or linear-lanceolate to narrow-linear,

outer smaller. Receptacle naked. Corolla of ♀ fl. tubular, filiform, mouth dentate; of inner florets tubular toothed. Anther-base 2-dentate, often unequally or shortly sagittate, not distinctly tailed nor with the produced bases cohering in pairs. Style-branches narrow-linear papillose. Achenes glabrous or thinly pilose, the hairs often in faint longitudinal rows; pappus 1-seriate, setiform.—Herbs or frutescent below, tomentose pubescent scabrid or glabrate. Leaves alternate, simple, entire or denticulate, decurrent. Capitula varying to 1 in. diam., variously panicled or axillary.

• A small genus of the Old World Tropics.

Branches alate with interrupted wings . . . . . 1. *L. pterodonta.*
Branches alate with continuous wings.
  Peduncles varying to 1 in.
    Repeatedly divaricate. Leaves entire . . . . . 2. *L. divaricata.*
    Panicle pyramidal or elongate. Leaves denticulate.
      Capitula 1–1¼ in. diam. (peduncles decurved) . . . . 3. *L. squarrosa.*
      Capitula ½–¾ in.
        Outer involucral scales glandular-pubescent or glabrate, not recurved at flowering . . . . . 4. *L. crassifolia.*
        Outer involucral scales tomentose or scabrid-pubescent.
          Leaves subentire or denticulate, hoary-floccose beneath . . . . . 5. *L. tomentosa.*
          Leaves dentate or denticulate, tawny-tomentose beneath . . . . . 6. *L. alata.*
Capitula subsessile.
  Involucral scales linear or linear-lanceolate, not herbaceous; wings broad.
    Capitula axillary. Leaves acute . . . . . 7. *L. Braunii.*
    Capitula terminating short axillary branches. Leaves obtuse . . . . . 8. *L. oblonga.*
  Outer scales lanceolate herbaceous; wings narrow . . . 9. *L. brevipes.*

1. **L. pterodonta,** *Sch. Bip. in. Schweinf. Beitr. Fl. Æthiop.* p. 151. Stout erect herb, often viscid, branched above, 2–7 ft. high; branches striate, puberulous especially above, alate with toothed or interrupted wings. Leaves alternate, elliptical-oblong or lanceolate, more or less acute, narrowed at the base, membranous, puberulous, dentate or denticulate, decurrent, ranging up to 6 in. long by 2¾ in. wide. Capitula widely campanulate, ∞-flowered, ⅜ in. long, on pedicels about ½ in. long, often nutant, in large terminal pyramidal panicles. Scales of involucre pluriseriate, unequal, linear-lanceolate; innermost linear, acutely acuminate; outer short, sessile-glandular, spreading or recurved. Receptacle naked, flat. Ray-florets filiform; ligule 0. Anther-base bidentate or obtuse. Achenes pilose. Pappus subfulvous, uniseriate.—*Blumea pterodonta,* DC. Prodr. v. 448. *Serratula polygyna,* A. Rich. Fl. Abyss. i. 457, t. 62. *Laggera* (Blumea) *purpurascens,* Schultz Bip. in Hb. Schimp. Abyss. *Blumea purpurascens,* A. Rich. l. c. 395. *Conyza ctenoptera,* Kth.; Walp. Rep. vi. 133.

Abyssinian name, *Zagafela.*

Nile Land. Abyssinia, *Schimper! Petit!* Sennaar, *Kotschy!* Unyoro and Karagué, *Speke and Grant!* Mittu-land, *Schweinfurth!*

Occurs also in India, Madagascar, &c.

2. **L. divaricata,** *O. & H.* Shrubby, copiously divaricately branched; branches terete, striate, puberulous, alate, tawny pubescent-tomentose. Leaves alternate (upper) oblong or ovate-oblong, obtuse, entire, scabrid-pubescent, broadly decurrent; free portion scarcely exceeding $\frac{1}{2}$ in. in length. Capitula broadly campanulate, $\frac{1}{3}$–$\frac{2}{3}$ in. diam., ∞-flowered, on pedicels varying to $\frac{2}{3}$ in., in wide divaricate leafy much-branched panicles. Scales of involucre multiseriate, linear, acute; inner glabrous, early subpatent, at length reflexed; outer pubescent, successively shorter, with recurved herbaceous tips. Receptacle flat, naked. Ray-florets filiform, ligule 0. Anther-base bidentate; tips ovate-lanceolate, obtuse. Achenes hairy, with basal callus. Pappus of 10–12 setæ, uniseriate, subfulvous, shining.

Upper Guinea. Gaboon, 1° N. Lat., *Mann!*

3. **L. squarrosa**, *O. & H.* A stout erect scabrous herb, 2–3 ft. high or more. Branches terete, striate, thinly hoary-flocculose, alate with broad continuous wings. Leaves alternate (upper) elongate-lanceolate, subacute, entire, broad at the base, sessile, widely decurrent, 3 in. long by nearly 1 in. wide. Capitula widely campanulate or hemispherical, many-flowered, 1–1$\frac{1}{4}$ in. diam., on recurved arching pedicels $\frac{1}{2}$–1 in. long, on the (terminal and) axillary branches of an elongate leafy panicle. Scales of the involucre very numerous, multiseriate, recurved, covered with whitish curly loose hairs, glandular, narrowly linear-lanceolate, inner narrow-linear, acute. Receptacle plano-concave, naked. Ray-florets filiform. Anther-base bidentate or shortly sagittate. Achenes thinly pilose. Pappus sordid.

Mozamb. Distr. Tette, *Dr. Kirk!*

4. **L. crassifolia,** *Schultz Bip. in Hb. Schimp. Abyss.* sect i. n. 154, iii. 1996. Fruticose, erect, branched, 2–3 ft. high. Branches terete and glabrate below, pulverulent glandular-pubescent or setulose and alate above. Leaves alternate, narrowly elliptic or oblong, obtusely pointed or acute, somewhat narrowed at base, sessile, denticulate, glandulose-puberulous, venose, decurrent, ranging up to 2–3 in. long by $\frac{1}{2}$–1 in. wide. Capitula campanulate, many-flowered, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., erect or subnutant, on unequal peduncles ranging up to $\frac{2}{3}$ in. long, in pyramidal or elongate terminal panicles, 2–5 in. wide. Scales of involucre multiseriate, acute, inner linear, glabrous; outer lanceolate, puberulous, successively shorter, loosely appressed. Receptacle plano-convex, naked, $\frac{1}{6}$ in. diam. Ray-florets filiform, mouth dentate; ligule 0. Anther-base bidentate or shortly unequally sagittate, often unequally so. Achenes thinly silky, hairs more or less in longitudinal rows. Pappus sordid.—*Pluchea* (Laggera) *crassifolia*, Schultz Bip. in Hb. Schimp. Abyss. sect. ii. 939; *Blumea crassifolia*, A. Rich. Fl. Abyss. i. p. 394.

Abyssinian names *Schoyschogo, Ham ad Debel.*

Nile Land. Abyssinia, *Schimper!* Sennaar, *Kotschy!*

5. **L. tomentosa,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. i. 236. Stiff, erect, freely-branching, shortly hoary-tomentose herb, 5–6 ft. high. Stem subterete, narrowly alate, clothed with short hoary floc-

cose tomentum. Leaves alternate, linear-oblong or lanceolate, acute or subacute and callus-tipped, denticulate or subentire, sessile, decurrent, floccose, especially beneath, ranging to $2\frac{1}{2}$–$3\frac{1}{2}$ in. or more. Capitula broadly campanulate, ∞-flowered, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., on unequal hoary pedicels, up to 1 in. long, in few-headed cymes terminating the lateral branches, together forming a loose ample panicle. Scales of involucre multiseriate, inner linear-lanceolate, with a fine acumen, outer lanceolate, tomentose, lax or recurved at tip, often bristle-pointed, much shorter than the inner. Receptacle naked, $\frac{1}{3}$ in. broad. Ray-florets filiform; mouth 3–4-dentate. Anther-base bidentate. Achenes pilose. Pappus tawny, obscurely scabrid.—Schweinf. Beitr. Fl. Æthiop. p. 285; *Blumea tomentosa*, A. Rich. Fl. Abyss. i. 394; *B. Petitiana*, A. Rich. l. c. 395; *L. Petitiana*, Schultz Bip. in Schweinf. et Aschers Enum. p. 285.

Nile Land. Abyssinia, *Schimper! Roth! Q. Dillon and Petit!*
Abyssinian name *Kasch-Kăscho*.

6. **L. alata,** *Schultz Bip. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 94. Stout, pubescent or tomentose, often glandular, erect, branched herb, 1–6 ft. high. Stem and branches subterete, striate, pubescent, alate, wings continuous, entire. Leaves alternate, narrowly elliptical or elongate oblong, acute or obtuse, more or less narrowed at base especially the lower, sessile or lower sometimes narrowed into winged petiole, decurrent, more or less scabrous above, tomentose-pubescent or subscabrous beneath, dentate or denticulate; lower, including petioles, sometimes 10 in. long by $1\frac{1}{2}$ in. wide. Capitula widely campanulate, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., many-flowered, on spreading or arching pedicels $\frac{1}{4}$–1 in. long, in wide pyramidal terminal panicles. Scales of involucre multiseriate; inner linear, acute, glabrous or subglabrous, often purplish at tip; intermediate ones shorter, subglandular-tomentose with spreading or squarrose tips; outer shortest, spreading, tomentose. Receptacle flat, naked, $\frac{1}{4}$ in. diam., tuberculate. Ray-florets filiform; mouth 3–4-dentate. Anther-base bidentate, often unequally so or very shortly sagittate, the lobes appressed to filament. Achenes appressedly pilose; hairs in longitudinal rows. Pappus sordid or whitish.—*Blumea alata*, DC. Prodr. v. p. 448; *B. oloptera*, DC. *l. c.* ?

Upper Guinea. Senegambia, Niger, *Barter!* Cameroon Mountains, *Mann!*
Nile Land. Unyoro, *Speke and Grant!* Darfertit, *Schweinfurth!* (Specimen not in flower, like this species but with subentire leaves).
Lower Guinea. Congo, *Burton!*

7. **L. Braunii,** *Vatke in Linnæa* xxxix. p. 486 (1875). Stiff, erect, simple herb, 2 ft. high. Stem terete, puberulous, alate, wings $\frac{1}{6}$–$\frac{1}{4}$ in. wide more or less. Leaves alternate, narrow-elliptical or oblong, acute, serrulate, somewhat narrowed at the base, sessile, decurrent, scabrid-puberulous, ranging up to 5 in. long by 2 in. wide. Capitula hemispherical, $\frac{3}{4}$–$1\frac{1}{4}$ in. diam., ∞-flowered, subsessile or shortly pedunculate in a terminal simple or slightly branched leafy spike or raceme. Scales of involucre very numerous, multiseriate, linear, acuminate, puberulous; outer rather shorter, at length diverg-

ing and recurved at apex. Receptacle naked. Ligule 0. Anther-base obtuse or bidentate; tips oblong, obtuse. Achenes pilose, with few ascending hairs. Pappus whitish, uniseriate.

Nile Land. Abyssinia, *Q. Dillon and Petit! Schimper!*

Note.– In herb. Cosson. (Schultz Bip.) is a fragment, not sufficient for description, allied to this under the name of *Boriania megacephala*, Schultz Bip. It is Kotschy's Hb. Æthiop. No. 428.

8. **L. oblonga,** *O. & H.* Shrubby. Branches subterete, continuously alate. Leaves alternate, oblong or elliptic-oblong, obtuse, mucronate or apiculate, denticulate, scabrid on both surfaces, with prominent venation beneath, decurrent with rather broad entire wings, $1\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad. Capitula broadly campanulate, at length hemispherical, 1–$1\frac{1}{4}$ in. diam., subsessile, solitary or 2–3 together, terminating short lateral alate branchlets. Scales of involucre multiseriate, puberulous; inner linear, acuminate; outer much shorter, linear-lanceolate, acute with recurved tips. Receptacle naked, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. Ray-florets filiform; mouth minutely dentate. Disk-florets . . . . Achenes pilose, with erect hairs.

Lower Guinea. Congo, *Chr. Smith*

9. **L. brevipes,** *O. & H.* A stout, erect, branched, glandular-pubescent, tawny or ferruginous herb, 2–3 ft. high or more. Branches striate, narrowly winged. Leaves alternate, narrowly elliptical or oval-oblong, obtusely pointed, somewhat narrowed at the base, denticulate, veined, sessile or with winged petiole, decurrent, ranging up to 5 in. long by 1 in. wide. Capitula widely campanulate, many-flowered, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, subsessile or on very short axillary peduncles, in lateral and axillary spikes arranged in a pyramidal or elongate panicle. Scales of involucre multiseriate, much imbricated, acute; inner linear, glabrous; intermediate linear-lanceolate, glandular-tomentose; outer lanceolate, plane, herbaceous, tomentose on both sides, loosely appressed. Ray-florets filiform; mouth 3–4-dentate. Anther-base unequally bidentate or adnate, obtuse. Achenes thinly pilose. Pappus white.

Lower Guinea. Congo, *Burton! Chr. Smith!*
Mozamb. Distr. Zambesia, near Soche Hill, alt. 3,000 ft., *Dr. Kirk!*

28. **PLUCHEA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 290.

Capitula heterogamous, many-flowered, disciform; outer florets filiform, ∞-seriate, ♀; disk-florets tubular, hermaphrodite or sterile. Involucre ovoid, campanulate or hemispherical, scales pauci- or multiseriate, imbricate; outer ovate or ovate-lanceolate, usually firm or coriaceous, appressed. Receptacle naked. Corolla of ♀ florets filiform; ligule 0; mouth toothed; of inner florets tubular; mouth 3-fid. Anther-base tailed, tails cohering in pairs. Style-branches linear, subulate, papillose. Achenes not at all or slightly compressed, 4–7-gonous. Pappus 1-seriate, setaceous.—Shrubs or undershrubs or perennial herbs, puberulous pubescent or tomentose, sometimes glandular-viscid. Leaves alternate, entire denticulate or pinnatifid. Capitula

in corymbose or few-headed terminal cymes. Corolla "white, yellow or lilac."

A genus of the warmer regions of both hemispheres, numbering from 20 to 30 species.

Leaves all undivided, quite entire or denticulate.
Petioles $\frac{1}{4}$–$\frac{1}{2}$ in. long. . . . . 1. *P. odorata.*
Petioles shorter or obsolete.
Leaves decurrent in toothed wings . . . . . 2. *P. ovalis.*
Leaves not decurrent.
Leaves small, $\frac{1}{3}$–$\frac{5}{6}$ in. long . . . . . 3. *P. sordida.*
Leaves larger, 1–3 in. long.
Outer involucral bracts ovate, acute or apiculate.
Leaves membranous or subcoriaceous . . 4. *P. Dioscoridis.*
Outer involucral bracts broadly ovate, obtuse, not apiculate. Leaves coriaceous . . . 5. *P. lanceolata.*
Some of the leaves quite entire, other deeply incise-dentate . . . . . 6. *P. heterophylla.*
Leaves deeply pinnatifid . . . . . 7. *P. pinnatifida.*

1. **P. odorata,** *Cass. Dict.* xlii. p. 3. Herbaceous? Branches subterete, striate, tomentellous. Leaves oval-oblong, obtuse or subacute, narrowed at the base into the petiole, minutely denticulate, puberulous on both sides, 2–5 in. long by $\frac{3}{4}$–$1\frac{1}{3}$ in. wide, flat. Petioles $\frac{1}{4}$–$\frac{1}{2}$ in. long. Capitula campanulate-hemispherical, many-flowered, $\frac{1}{4}$ in. long, on short pedicels, in dense branched corymbose cymes 4 in. diam. Scales of the involucre pluriseriate; inner linear, acute, glabrous; outer oval or oblong, obtuse, pubescent, shortly ciliate, successively shorter. Receptacle flat, $\frac{1}{10}$ in. diam., naked. Achenes small, scattered with minute setæ.—DC. Prodr. v. p. 452, cum syn.

Upper Guinea. Senegambia, *Perrottet! Lelierre!*
Widely spread in Tropical America. *P. senegalensis*, Klatt. in Ann. Sc. Nat. Ser. v., xviii. 368, appears to be this species.

2. **P. ovalis,** *DC. Prodr.* v. p. 450. Shrubby, tawny-pubescent or tomentose. Branches terete, striate, leafy. Leaves elliptic or ovate, obtuse or subacute, denticulate-serrate, narrowed towards the sessile auriculate-clasping base, decurrent in unequally dentate wings, 1–2 in. long by $\frac{2}{3}$–1 in. wide. Capitula on short unequal pedicels, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., in dense corymbose terminal panicles. Scales of involucre lanceolate, or inner linear, subrigid, pluriseriate, imbricated, acute or subacute, puberulous, shortly ciliate; outer successively shorter. Receptacle flat, naked. Achenes glabrous or with a few short hairs on the angles. Pappus sordid, uniseriate, scabrous.—*Baccharis ovata*, Sieber! Pl. Seneg. Exsicc. n. 61; *B. ovalis*, Pers. Synops. ii. p. 424, ex DC. *l. c.*

Upper Guinea. Senegambia, *Brunner! Sieber!*
Occurs also in Atlantic Islands and N.W. India.

3. **P. sordida,** *O. & H.* Shrubby, 2–3 ft. high or more. Leaves narrowly obovate, obtuse, narrowed to the sessile base, entire or nearly so, tomentose or both sides, $\frac{1}{3}$–$\frac{5}{6}$ in. long. Heads campanulate, $\frac{1}{4}$ in. long, on short pedicels, in numerous small globose cymes. Female florets numerous; male about 5. Scales of the involucre pluriseriate,

acute, lanceolate, thinly pubescent. Receptacle concave. Achenes small, scattered with minute setæ.—*Laggera sordida*, Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 325.

Mozamb. Distr. I. Zanzibar, *Hildebrandt!*

4. **P. Dioscoridis,** *DC. Prodr.* v. 450. Fruticose, varying to 6 ft. or more in height. Branches terete, striate, more or less puberulous or pubescent towards the extremities, rarely glabrous. Leaves oval-oblong, narrowly elliptical or linear-lanceolate, acute or subacute, narrowed towards the sessile or shortly petiolate often auriculate-cordate base, serrate denticulate or subentire, puberulous or glabrous, 1–2 in. long by $\frac{1}{4}$–1 in. wide, membranous. Capitula campanulate or ovoid, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, pedicelled or usually sessile, few together in stalked clusters, collected in ample much-branched corymbose or globose terminal panicles. Scales of involucre pluriseriate; inner linear or linear-lanceolate, acute or apiculate, sometimes fimbriate-dentate, glabrous or nearly so, caducous; outer shorter, ovate, puberulous or pubescent, acute or obtuse and apiculate, persistent. Receptacle narrow, naked. Achenes glabrous or nearly so, 4–7-costate, angles paler. Pappus uniseriate, sordid.—*Baccharis Dioscoridis*, L.; *Conyza Dioscoridis*, Rauw.; *Baccharis ægyptiaca*, Forsk.; *C. baccharoides*, Schultz Bip. in Hb. Schimp. Abyss. sect i. n. 146; *Blumea baccharoides*, Sch. Bip. in Hb. Schimp. Abyss. sect. ii. n. 1018; *Conyza modatensis*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 144.

Nile Land. Abyssinia, *Schimper! Hildebrandt!* (*P. Kraussii.* Sch. Bip. varr. *mossambiquensis* and *glaberrima*, Steetz in Peters Mossamb. Bot. 443); Cordofan, *Kotschy!*

Lower Guinea. Congo, *Chr. Smith!* Angola; Loanda and Ambriz, *Monteiro!* Loango, *Soyeaux!*

Mozamb. Distr. Kanyenye, 6° 24′ S. lat., *Speke and Grant!* (lilac-flowering); Zanzibar I., *Hildebrandt!* (flowers lilac); Rovuma River, 16–26 miles up, *Dr. Kirk! Dr. Meller!* Banks of Luabo, 18 miles from sea; var. *glabra*, (*C. Kraussii*, Sch. Bip. in Walp. Repert. ii. 972), glabrous, shining; leaves narrow; capitula oblong, Dr. *Kirk!* Cabaceira and Inhambane, *Dr. Peters!*

Occurs also in Natal, Egypt, Arabia, Palestine.

A remarkably luxuriant form with larger heads and leaves attaining 2–3 by $1\frac{1}{2}$–2 in. was collected by Dr. Schweinfurth in the Great Oasis.

5. **P. lanceolata,** *O. & H.* Small shrub, 1–3 ft. high or more, erect, branched, covered with soft short whitish close appressed pubescence. Leaves oval-oblong, mucronate, narrowed at the base, coriaceous, entire or (in Indian specimens) acutely serrulate, sessile, about $1\frac{1}{2}$ in. long by $\frac{2}{5}$ in. wide. Capitula ovoid or campanulate, about $\frac{1}{4}$ in. wide, many-flowered, on short pedicels or subsessile, in dense terminal tomentose or pubescent corymbs. Flowers pink. Scales of involucre pluriseriate, imbricated, appressed; outer broadly ovate, short, obtuse; innermost linear, acute, scarious. Receptacle flat, naked. Achenes glabrous. Pappus of sterile flowers uniseriate, sordid; setæ complanate, confluent into a sheath below.—*Berthelotea lanceolata*, DC. Prodr. v. p. 367; Delessert, Icon. Select. Plant. iv. t. 21.

Upper Guinea. Senegambia, *Perrottet!*

Occurs also in N. W. India.

6. **P. heterophylla,** *Vatke in Oesterr. Bot. Zeitschr.* 1875, p. 325. A low shrub, but little branched, about 8 in. high, covered above as well as the involucral bracts with stipitate glands, otherwise glabrous; branchlets thin, leafy. Leaves obovate-oblong, fleshy ?, narrowed at the base into the petiole, about $1\frac{1}{2}$ by $\frac{1}{5}$ in., in some cases quite entire and rather obtuse, in other cases deeply incise-dentate, with lobes and apex acute, lepidote-punctate on both sides. Heads few, pedunculate, subcorymbose. Involucral scales in many rows, narrow, recurved at the apex; the outer ones gradually shorter, rather obtuse; the innermost ones acute; common peduncle bracteate. Female florets in many rows, numerous; corolla tubular, filiform, bidentate at the apex; stigmas exserted. Male florets in the middle of the head, numerous, exceeding the female; corolla narrowly tubular, shortly 5-fid at the apex. Style undivided, very slightly bilobed at the tip. Anthers shortly caudate-acuminate at the base. Achenes appressedly setose. Receptacle shortly foveolate. Setæ of the pappus in one row, rather scabrid.

Nile Land. Somali country, among the Ahl Mountains, *Hildebrandt!*
The description is taken from Vatke, *l. c.*

7. **P. pinnatifida,** *Hook. fil. Ic. Pl.* t. 1156. Shrubby, divaricately branched. Branches pale brown, terete, glabrous below, glandular-puberulous and leafy above, viscid at the extremities. Leaves deeply pinnatifid, glandular-viscid, $\frac{1}{2}$–1 in. long by $\frac{1}{3}$–$\frac{2}{5}$ in. wide; lobes linear, simple or occasionally toothed. Capitula campanulate, $\frac{1}{3}$ in. wide, many-flowered, solitary or subsolitary, on long rather thick stalks, $\frac{1}{2}$–1 in. long, terminating the flowering branches. Scales of involucre multiseriate; outer linear-lanceolate, successively shorter; inner linear, glandular-puberulous, shortly ciliate, acute, mostly appressed. Receptacle flat, $\frac{1}{12}$ in. diam., naked. Achenes thinly and shortly pilose, not compressed. Pappus of few (8–10) sordid setæ.

Nile Land. Somali country, *Capt. Playfair!*
One of the sources of the drug *Dagaboot* or *Gagaboot.* See also note under *Iphiona rotundifolia.*

29. DENEKIA, Thunb.; Benth. et Hook. f. Gen. Pl. ii. p. 293.

Capitula heterogamous, disciform, many-flowered; outer florets filiform ♀, of the disk sterile. Involucre broadly campanulate; scales biseriate, subequal; inner membranous; outer herbaceous with membranous margins. Receptacle plane, naked. Corolla of ♀ florets filiform; mouth 2-lobed; lobes many times shorter than tube, ovate; of sterile florets tubular-infundibuliform, 5-fid, with recurved or revolute segments. Anthers shortly tailed, apex acuminate. Style-branches ovate, obtuse. Achenes of ♀ florets very small, oblong, terete or subterete, epappose; of sterile florets slender, with pappus reduced to a single (or 2) long filiform seta, pedicellate, plumose at apex.—Weak annual or biennial herbs, usually branching from the crown. Leaves alternate, oblong, amplexicaul, cottony below (or glabrate). Capitula

white or bluish, irregularly cymose or congested at the extremities of the slender peduncles.

A genus of not more than three species restricted to South Tropical Africa and the Cape.

1. **D. capensis,** *Thbg.*; *DC. Prodr.* v. 462; *Var.* Herb of ¼–1 ft., giving off numerous ascending slender thinly lanate or glabrate branches from the crown. Leaves linear-oblong, acute, sessile, amplexicaul, sometimes auricled at the base, denticulate or sinuous-dentate, thinly tomentose or glabrous above, white-lanate beneath; lower and radical leaves narrowed into winged petiole, varying to 3–4 in. long, gradually smaller above. Capitula cymosely clustered at the extremities, subsessile or pedicels varying to ¼ in., ⅙ in. more or less in diam. Involucral scales narrow-oval; outer minutely setulose; inner membranous, ciliate. Achenes (of ♀ florets) setulose.—Hook. f. Ic. Pl. 1138.

South Central. Highlands of Batoka Country, *Dr. Kirk!*
Also at the Cape.

30. **EPALTES,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 293.

Capitula heterogamous, disciform; outer florets ♀ ∞-seriate; of disk hermaphrodite, usually sterile. Involucre ovoid campanulate or hemispherical; scales 2–∞-seriate, imbricate, nearly equal or outer successively shorter. Receptacle convex or elevated with central depression, naked, or minutely alveolate. Corolla of ♀ florets tubular or filiform, of ☿ florets tubular, dilated or infundibuliform above. Anther-base tailed; apical connective ovate or ovate-oblong, obtuse. Style terete, papillose, undivided or minutely emarginate. Achene oblong or narrowed below, longitudinally costate. Pappus 0.—Erect or diffuse herbs. Leaves alternate, oval or oblong, entire or serrate, usually more or less distinctly decurrent. Capitula small, in terminal corymbose cymes or few-headed clusters.

A small tropical genus. Neither of the following is restricted to the Tropical African Flora.

Scales of receptacle 2–3-seriate, nearly equal. Receptacle convex . . . . . 1. *E. brasiliensis.*
Scales of receptacle ∞-seriate; outer successively shorter.
Receptacle raised, cupuliform . . . . . 2. *E. gariepina.*

1. **E. brasiliensis,** *DC. Prodr.* v. p. 461. Pubernlous or nearly glabrous branching herb, about 4 ft. high; branches faintly striate; upper alate, leafy. Leaves oval, acute or subacute, cuneately narrowed to clasping decurrent base, serrulate, 2–3 in. long by ½–1 in. wide. Capitula sub-hemispherical or -globose, many-flowered, ¼ in. diam., on unequal angular or subulate pedicels not exceeding ½ in. long, in small lax terminal corymbs. Scales of involucre 2–3-seriate, obovate, obtuse or broadly acute; inner narrower. Receptacle naked, convex, dilated. Flowers purplish.—*Ethulia brasiliensis,* Link; DC. Prodr. v. p. 13. *Conyza brasiliensis,* Hort. Angl. ex Steetz in Peters Mossamb. Bot. p. 455. *Pachythelia brasiliensis,* Steetz. l. c.

Upper Guinea. Princes Island, *Barter! Mann!* St. Thomas Island, *G. Don!*
Lower Guinea. Coast south of the equator, *Curror!*
A common Brazilian species.

2. **E. gariepina** (garipina), *Steetz in Peters Mossamb. Bot.* p. 451. Suffruticose, scabrid-puberulous or subglabrous and glaucescent, much-branched, probably 1–3 ft. high or more; branches more or less alate, rather slender, subterete, striate. Leaves linear-oblong or -lanceolate, acute or mucronate, somewhat or scarcely narrowed towards a decurrent sessile base, entire or callose-serrulate, 1–2½ in. long by ⅛–½ in. wide or larger; upper less. Capitula campanulate or campanulate-oblong, subturbinate at the base, ⅙ in. wide, on short pedicels, crowded 3–6 together, at the extremities. Scales of involucre multiseriate, appressed, imbricated, coriaceous; innermost linear or oblong, acuminate, often purplish-tipped; outer lanceolate or ovate-lanceolate, acute, successively shorter. Receptacle free, elevated, centre concave cupuliform. —*E. alata*, Steetz l. c. p. 452. *E. umbelliformis*, Steetz l. c. p. 452. t. 49. *Ethulia ? gariepina*, DC. Prodr. v. p. 13. *Ethulia alata*, Sond. in Linnæa, xxiii. p. 60. *Litogyne glabra*, Harv. Thes. Cap. ii. p. 35, t. 155. *L. scabra*, Harv. Fl. Cap. iii. p. 48.

Nile Land. Cordofan, *Kotschy!* (probably *E. Kotschyi*, Sz. Bip. in Schweinf. and Aschers. Enum. p. 284).

Mozamb. Distr. Zambesi, *Dr. Kirk! Dr. Stewart!* Sena, *Dr. Peters!*

Occurs also in South Africa and, according to Dr. F. W. Klatt, in Mauritius.

31. SPHÆRANTHUS, L.; Benth. et Hook. f. Gen. Pl. ii. 294.

Capitula heterogamous few- (3–7 usually in Tropical African species) flowered, collected on a plane convex ovoid or elongate common receptacle, in dense hemispherical ovoid or globose heads. Scales of involucre few (3–10), subequal, often cymbiform or conduplicate, subtended by a scale of common axis (axial scale). Pistillate florets 2–5 or more; corolla tubular, often slightly narrowed to the minutely 3-dentate mouth; hermaphrodite (or sterile) florets 1 or 2–3; corolla tubular, 5-dentate. Anther-tails short, cohering in pairs, apical connective ovate. Style strongly papillose, undivided or shortly bifid. Achenes subterete or slightly compressed, oblong or narrowed below; pappus 0.—Herbs with alternate, lanceolate oblong or linear, dentate or denticulate, decurrent leaves. Heads singly terminating the stem and numerous branches; capitula small, closely packed.

A small genus of the Old World Tropics.

S. africanus, L. Sp. Pl. 1314, remains obscure and doubtfully Tropical African. *S. angustifolius*, DC. is also doubtful.

See *Sphæranthus*, sp. nov.? aff. *S. pedunculari*, Oliv. in Journ. Linn. Soc. Lond. xv. p. 91 (1876).

Hermaphrodite florets 2–3 in each capitulum.

Heads of capitula ovoid-oblong. Leaves not decurrent . .	1. *S. Kirkii.*
Heads of capitula ovoid-oblong. Leaves decurrent . . .	2. *S. sphenocleoides.*
Heads of capitula subglobose. Leaves decurrent.	
Glabrous or nearly so	3. *S. suaveolens.*
Hirsute or hoary-tomentose	4. *S. hirtus.*

Hermaphrodite florets solitary, one in each capitulum (*Oligolepis*).

Heads of capitula distinctly stalked. Outer axial scales short.	
Tomentose or pubescent	5. *S. polycephalus.*
Glabrous or puberulous	6. *S. Steetzii.*
Heads of capitula subsessile or shortly stalked. Outer axial scales nearly equalling the heads	7. *S. nubicus.*

1. **S. Kirkii,** *O. & H.* Glabrous herb, probably of 1 ft. more or less, diffuse or ascending, branching from the base; branches exalate. Leaves linear, acute, slightly narrowed below, sessile not decurrent or only with an obscure raised line, denticulate, punctate, 1–3 in. long, $\frac{1}{6}$–$\frac{1}{3}$ in. broad. Capitula with 2 hermaphrodite and about 4 pistillate florets, densely crowded, each in the axil of closely appressed purple coriaceous scales, deltoid and apiculate above, in ovoid-oblong obtusely pointed sessile or shortly pedunculate lateral and terminal heads $\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. Involucral scales conduplicate, subacute, subscarious with membranous margins. Common receptacle elongate, narrow, $\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad. Corolla of ♀ fl. tubular, subcoriaceous, obscurely contracted immediately below the 5 teeth. Achenes obscurely angular, pubescent.

Mozamb. Distr. Bagamoyo, Zanzibar, *Dr. Kirk!*

Nearly allied to *S. amaranthoides*, Burm. of India, in which the axial scales are much more strongly apiculate.

2. **S. sphenocleoides,** *O. & H.* A nearly glabrous herb, 6–12 in. high. Branches winged by the decurrent leaves. Leaves oblong, obtuse or apiculate, minutely denticulate, sessile, $\frac{3}{4}$–2 in. long. Heads of capitula ovoid-oblong, $\frac{1}{2}$ in. long. Peduncles solitary, $\frac{1}{2}$–$\frac{3}{4}$ in. long, winged by the decurrent bracts at the top. Hermaphrodite florets 2 together in each capitulum. Achenes minutely glandular. —*S. microcephalus*, Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 326; nec Willd.

Mozamb. Distr. Zanzibar, in marshy places, *Hildebrandt!*

3. **S. suaveolens,** *DC. Prodr.* v. 370. Erect or ascending herb, 1–2 ft. high, branched, glabrous or extremities puberulous; stem and branches alate. Leaves narrow-elliptic oblong or linear, acute or subacute, usually narrowed to the decurrent base, dentate or denticulate, 2–5 in. long, $\frac{1}{10}$–$1\frac{1}{3}$ in. broad. Capitula few-flowered, densely crowded in ovoid-globose shortly pedunculate terminal and lateral heads $\frac{1}{2}$–$\frac{2}{3}$ in. diam., solitary or occasionally 2–3 approximated; peduncles $\frac{1}{2}$–5 in. alate. Scales of partial involucre 5–7 obovate- or linear-oblong or linear, obtuse, apiculate, ciliate above. Outer axial scales short, puberulous, ciliate. Common receptacle ovoid. Flowers white or rose-coloured. Hermaphrodite fl. 2–3 in each capitulum. Achenes thinly pilose.—*S. indicus*, Gaertn. Fruct. ii. 413, t. 164, f. 5 (non Linn.). *S. abyssinicus*, Steetz in Peters Mossamb. Bot. 411. *S. angustifolius*, Sch. Bip. in Kotschy, Hb. Nub. no. 463.

Nile Land. Sennaar, *Kotschy!* Abyssinia, *Schimper! Q. Dillon and Petit!*

Var. *angustifolia* (leaves linear), *Kotschy!* (Hb. no. 500) Madi (flowers blue), *Speke and Grant!* Bongo-land, Mittu-land and Niamniam-land, *Schweinfurth!*

Occurs also in Egypt. *S. Kotschyi*, Sch. Bip. based upon some of the specimens distributed by Kotschy under No. 463 (Schw. Fl. Æthiop. p. 308) is known to us by name only.

4. **S. hirtus,** *Willd.*; *DC. Prodr.* v. p. 369. Erect or ascending, branching, 2–3 ft. high, hoary-lanate-tomentose or hirsute; lower branches terete, striate, at length shining, upper alate; wings spinulose-denticulate. Leaves obovate ovate or lanceolate, acute or subacute, mucronate, somewhat narrowed towards the sessile clasping base, decurrent, spinulose-denticulate, $\frac{1}{2}$–$1\frac{1}{2}$ in. long by $\frac{1}{3}$–$\frac{2}{3}$ in. wide. Capitula few-flowered, of which 2–3 are hermaphrodite in globose or subglobose pedunculate terminal and lateral heads, $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; peduncles $\frac{1}{2}$–$2\frac{1}{2}$ in. long, alate. Common receptacle globose. Corolla of ☿ fl. tubular. Scales of partial involucre 8–10, linear, slightly dilated and ciliate above, acute or apiculate; outer axial scales short, concealed at base of head. Achenes thinly hairy.—*S. senegalensis*, DC. l. c. p. 370.

Upper Guinea. Senegambia, *Roger! Brunner!* Sierra Leone, *G. Don! Afzelius!*
Mozamb. Distr. (*S. mossambiquensis*, Steetz in Peters Mossamb. Bot. 421.) Mozambique island and mainland, *Peters!* (a hirsute not hoary-cottony form).

Occurs also in India and Australia.

5. **S. polycephalus,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 95, t. 59. Much-branched, tufted, tomentose herb; branches faintly striate, alate above. Leaves oblong or lanceolate, subacute, setulose-dentate as are the wings, with wide sessile decurrent base, $\frac{1}{2}$–$1\frac{1}{2}$ in. long by $\frac{1}{6}$–$\frac{1}{3}$ in. wide or more. Capitula turbinate, with 1 hermaphrodite fl. only, crowded in globose terminal and lateral (purplish) heads, $\frac{1}{4}$ in. diam., solitary, on naked pubescent peduncles $\frac{1}{3}$–1 in. long. Scales of partial involucre 7–8, membranous-scarious, ciliate, lanceolate oblanceolate or oval, acute or acuminate, sub-1-nerved. Outer axial scales short. Common receptacle ellipsoidal or ovoid, $\frac{1}{12}$–$\frac{1}{10}$ in. long. Hermaphrodite floret solitary; corolla tubular-infundibuliform. Achenes slightly compressed or subterete, glabrous.—*S. hirtus*, T. Thoms. in Speke, Journ., App. p. 637, *non Willd.*

Mozamb. Distr. Zungomero, *Speke and Grant!*

6. **S. Steetzii,** *O. & H.* Erect or ascending herb, from a branching base, glabrous below or nearly so, puberulous above, about 1–2 ft. high. Branches subterete below, alate above. Leaves linear or narrowly oval, acute, mucronate, somewhat or scarcely narrowed towards a sessile decurrent base, denticulate, 1–$2\frac{1}{2}$ in. long by $\frac{1}{6}$–$\frac{1}{3}$ in. wide. Capitula about 5-flowered, of which 1 fl. (central) only is male, in depressed ovoid-hemispherical heads, obtusely conical at apex, $\frac{3}{8}$ in. diam., terminating the stem and branches. Common receptacle hemispherical or depressed-ovoid. Scales of partial involucre oblong or linear-oblong; outer dilated above, obtuse, apiculate; outer axial scales ovate or broadly elliptical, apiculate, puberulous, shortly ciliate, closely appressed. Achenes thinly hairy.—*S. angustifolius*, Schultz Bip. in Hb. Schimp. Abyss. sect. ii. n. 525, non DC. *Oligolepis angustifolia*, Steetz in Peters Mossamb. Bot. p. 417.

Nile Land. Nubia, *Kotschy!* Abyssinia, *Schimper!*
? Mozamb. Distr. Zambesia, *Stewart!*

7. **S. nubicus,** *Sch. Bip. ex Steetz in Peters Mossamb. Bot.* p. 418. Annual, erect, little branched, or diffuse with numerous ascending branches, more or less glandular-hirtellous, about 1–2½ ft. high; stem and lower branches terete, faintly striate, upper branches alate. Leaves narrowly lanceolate or linear, acute or subacute, mucronate, denticulate, sessile, decurrent, membranous, 1–3 in. long by $\frac{1}{10}$–$\frac{3}{4}$ in. wide. Capitula 3–9 (usually 4-) flowered, of which 1 fl. (central) only is male, crowded many together in subhemispherical subsessile or shortly pedunculate heads $\frac{1}{3}$–$\frac{1}{2}$ in. diam., terminating the stem and branches. Scales of partial involucre 3–5, scarious, linear-oblong, obtuse, apiculate, ciliate at apex, otherwise glabrous. Outer axial scales nearly equalling the head, closely appressed, broadly ovate, apiculate, pubescent. Common receptacle slightly convex. Corolla with scattered sessile glands. Achenes thinly hairy.—*Sprunnera alata*, Schultz Bip. in Kotschy Iter Nub. n. 209. *Oligolepis Sprunnera*, Steetz in Peters Mossamb. Bot. p. 418.

North Central. Lake Tschad, Kouka, *E. Vogel!*
Nile Land. Cordofan, *Kotschy!*

32. BLEPHARISPERMUM, Wight; Benth. et Hook. f. Gen. Pl. ii. 295.

Capitula heterogamous, discoid, few-flowered, collected in globose heads; outermost florets pistillate, 2 (or few), inner ☿ usually 4 (in African sp.), fertile or sterile, each floret subtended by a scale equalling or exceeding it in length, the capitulum subtended by an axial scale. Corolla of ♀ fl. narrowly tubular, of ☿ floret slightly wider upwards, 5-toothed. Anther-base tailed, tails cohering in pairs. Style papillose, apex minutely bifid. Achene of ♀ fl. broadly alate with coriaceous wings, concave, somewhat keeled, apex bifid; pappus of 3–4 stout barbellate setæ.—Shrubs or undershrubs. Leaves alternate, ovate or lanceolate. Heads of capitula terminal, globose, ½–1½ in. diam.

A genus of four species, of which two are Indian. The following two species are endemic, and one of them is exceptional in its apparently scandent habit and spinose armature.

Male florets 4 in each head. Branches spinulose. . . . 1. *B. spinulosum.*
Male florets 2 only in each head. Branches unarmed . . 2. *B. zanguebaricum.*

1. **B. spinulosum,** *O. & H.* Apparently a scandent shrub; branches slender terete glabrate striate, armed with short deflexed acute spines, $\frac{1}{12}$–$\frac{1}{6}$ in. long, from the pulvinus immediately under each leaf. Leaves (imperfect) ovate, rounded at base, midrib puberulous beneath, about 1½–2 in. long; petiole ¼ in. Heads globose, singly terminating the branches, ⅔–¾ in. diam. Capitula usually of 6 decussating squamæ each subtending a single floret; two outer squamæ obovate concave apiculate, subtending ♀ fls., 2 intermediate cymbiform. Achene obcordate or obovate, emarginate, ciliate above.

Lower Guinea. Congo, *Chr. Smith!*
The remarkable infra-petiolar spine is represented by a gibbosity in the following species as well as in the Indian ally, *B. petiolare*, DC.

2. **B. zanguebaricum,** *O. & H.* Branches terete striate, thinly hispid-pubescent above, glabrescent below, leafy. Leaves ovate or oval, shortly acuminate or pointed, apiculate, rounded or obtuse at base, subrepand, subglabrescent, shortly petiolate, membranous, 2–4 by 1–2 in.; petiole about $\frac{1}{4}$ in., puberulous, from a thickened gibbous not spinulose pulvinus. Clusters of heads globose, about $\frac{1}{2}$ in. diam., about 2 together, on peduncles of $\frac{1}{2}$–1 in. Capitula of 6 decussating scales, the outermost and intermediate pairs subtending 2 female and 2 hermaphrodite florets respectively, the intermediate cymbiform, the innermost smallest. Achenes of the female florets as in the previous species; of the hermaphrodite florets surmounted by about ten unequal paleæ and stout setæ.

Mozamb. Distr. Zanguebar, Mombasa, at 300 ft. alt., *Kirk!*
Differs from the East Indian *B. petiolare*, DC., by shorter petioles and by the presence of a pappus in the hermaphrodite florets.

33. FILAGO, Linn.; Benth. et Hook. f. Gen. Plant. ii. p. 299.

Capitula heterogamous disciform, collected in sessile globose terminal heads; outer florets ♀ ∞-seriate, central ☿ usually few, fertile or sterile. Involucre small, outer scales ovate-lanceolate, inner elliptic-ovate, apiculate with broad membranous margins, outer more or less cottony, singly subtending ♀ florets. Corolla tubular, of ♀ fl. filiform. Anther-base tailed. Style-branches linear or oblong obtuse. Achenes small, subterete or slightly compressed; setæ of pappus slender, equalling the florets.—Annual herbs, usually cottony or tomentose. Leaves alternate, entire. Heads of capitula cottony, usually involucrate, of the primary axis overtopped by axillary branches originating immediately below and terminating in similar heads.

A small genus of Europe, Asia and North Africa, one or two being widely diffused weeds.

1. **F. germanica,** *L.; DC. Prodr.* vi. 247. Erect or ascending or (in specimens from other countries) decumbent annual, ranging up to 1 ft. high (tropical African specimens slender, 3–5 in. only); whole plant more or less lanate; branches terete. Leaves linear or linear-spathulate, acute, sessile, subamplexicaul, not decurrent, in our specimens $\frac{1}{4}$–$\frac{3}{4}$ in. long by $\frac{1}{16}$–$\frac{1}{12}$ in. wide. Capitula campanulate, subpentagonal, $\frac{1}{10}$ in. wide, sessile, many together, crowded in globose heads, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. Outer ♀ florets only inserted singly in the axil of the outer involucral scales. Receptacle narrow convex closely tuberculate. —*F. apiculata*, Linn., and *F. pyramidata*, Linn. (Schweinf. & Aschers. Enum. p. 285.). *F. abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. sect. iii. n. 1913; Rich. Fl. Abyss. i. 432. *Gnaphalium hurdwaricum*, Wall. Cat. n. 2951.

Nile Land. Abyssinia, *Schimper!*
Widely distributed in Europe and Asia.

34. CHILIOCEPHALUM, Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 300.

Capitula heterogamous, disciform, few-flowered (5–15), collected in dense horizontal terminal cymes, outer or all the florets ♀, ☿ fl. 1–2 or wanting. Involucre small, ovoid, nearly equalling the florets, scales 2–3-seriate, obtuse. Receptacle naked. Corolla tubular of ♀ fl. narrow, mouth 3-fid, of ☿ fl. slightly wider above, 5-toothed. Anther-base shortly tailed. Style-branches obtuse or truncate. Achenes oblong, terete, glabrous; pappus 0.—Herb, more or less lanate, with erect stems from the crown of 1–3 ft. Leaves alternate decurrent.

Confined to Abyssinia.
Remarkable in this section in the absence of pappus.

1. **C. Schimperi,** *Benth. in Hk. Ic. Pl.* 1137. Erect herb, 1–2½ ft. high, somewhat branched at crown, simple or subsimple above, hoary-tomentose or lanate on underside of leaves, inflorescence and upper part; stem and branches below terete, finely striate. Leaves linear or oblanceolate, acute or obtuse, mucronate, slightly narrowed below to sessile base, upper slightly, lower distinctly, decurrent, ½–1½ in. long by ¼–½ in. wide, longitudinally veined and thinly covered with short crisped pubescence above, sometimes viscid-glandular. Capitula campanulate-oblong, subsessile, $\frac{1}{16}$ in. long, crowded in dense corymbose lanate cymes, 1½–4 in. diameter.—*Kralikia myriocephala*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 151. *K. Schultzii*, Buchinger ex Schultz Bip. in Schweinf. l. c p. 151.

Nile Land. Abyssinia. Banks of high mountain streams in Semen, 10,000 ft., fl. October, *Schimper!*

The generic name *Kralikia* has been appropriated for a genus of grasses by Cosson and Durieu.

35. PHAGNALON, Cass.; Benth. et Hook. f. Gen. Pl. ii. 304.

Capitula heterogamous, disciform, many-flowered; outer florets ∞ ♀, central ∞ ☿. Involucre campanulate or subhemispherical, scales ∞-seriate, imbricate and scarious or membranous, outer gradually shorter. Receptacle plane naked (or foveolate). Corolla of ♀ fl. tubular, filiform, minutely dentate, of ☿ fl. tubular but slightly wider above, 5-toothed. Anther-base scarcely or obscurely produced at base; apical connective ovate obtuse or retuse. Style-branches obtuse or subtruncate. Achenes small; pappus of slender 1-seriate setæ.—Small shrubs ascending or decumbent, more or less whitish tomentose or glabrate. Leaves alternate narrow. Capitula of medium size, pedunculate, solitary or loosely corymbose or axillary.

A small genus extending from the Atlantic Islands eastward into Asia.
White-lanate or -tomentose on under surface of leaves, &c. Peduncles often long, terminal and from upper axils only.

Peduncles branched . . . . . 1. *P. hypoleucum.*
Peduncles usually simple.
Involucre thinly woolly, scales acute. . . . . 2. *P. Schweinfurthii.*
Involucre glabrous or nearly so, outer scales obtuse . . 3. *P. nitidum.*

Glabrous or nearly so. Peduncles short axillary and terminal . . . . . 4. *P. scoparium.*

P. Borianum, Sch. Bip. (Schw. & Asch. Enum. 286) is unknown to us.

1. **P. hypoleucum,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 854. Shrubby below. Upper branches erect subvirgate rather slender with under surface of leaves white-lanate. Leaves spreading linear, subacute, mucronate, amplexicaul, slightly and shortly decurrent, denticulate, margins revolute, 1–2 in. long by $\frac{1}{12}$–$\frac{1}{4}$ in. wide. Capitula campanulate-hemispherical, many-flowered, on unequal slender pedicels ranging up to $2\frac{1}{2}$ in. long, in few-headed corymbose or elongated terminal cymes 2–3 in. diameter. Scales of involucre loose or spreading, persistent, slightly woolly on the back; inner linear, acute; outer oval subacute or obtuse.

Nile Land. Abyssinia, *Schimper!*

2. **P. Schweinfurthii,** *Schultz Bip. in Hb. Schweinf. Nub.* n. 365. Shrubby below; branches ascending, slender, clothed with close white tomentum. Leaves linear, acute, mucronate sessile, subauriculate-amplexicaul, subentire, green and subglabrate above, more or less hoary-lanate beneath, 1–$2\frac{1}{2}$ in. long by $\frac{1}{12}$–$\frac{1}{4}$ in. wide; margins slightly revolute. Capitula widely campanulate, many-flowered, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., on slender hoary peduncles 1–4 in. long, bearing a few reduced leaves below, terminal or from the upper axils. Scales of involucre acuminate, apiculate, thinly woolly on the back, persistent; inner linear, outer lanceolate or ovate. Receptacle plano-convex, $\frac{3}{8}$ in. diameter.

Nile Land. Nubia, Soturba, *Schweinfurth!*

3. **P. nitidum,** *Fresen.; DC. Prodr.* v. 397. Much branched and shrubby below from a woody decumbent stock, 2 ft. high or more. Branches ascending terete leafy and hoary-tomentose above as well as the under-surfaces of the leaves and peduncles. Leaves linear, acute, sessile, subamplexicaul, entire or distantly dentate or denticulate, flat or with revolute margins, 1–3 in. long by $\frac{1}{12}$–$\frac{1}{4}$ in wide. Capitula campanulate-hemispherical, many-flowered, $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, solitary or loosely corymbose on long slender peduncles $\frac{1}{2}$–5 in. long, terminal and from the upper axils. Scales of involucre multiseriate, imbricated, glabrous, or nearly so; inner linear, acuminate, caducous; outer obovate, rounded at apex, persistent. Achenes thinly hairy.—*Phagnalon abyssinicum*, Schultz Bip. in Hb. Schimp. Abyss. sect. i. n. 251; A. Rich. Fl. Abyss. i. p. 396, excl. synon.; *P. Quartinianum*, A. Rich, l.c.

Abyssinian name *Teum Tsch'enna.*

Nile Land. Abyssinia, *Schimper! Petit! Q. Dillon!*

Extends through Arabia and Persia to Affghanistan and Beloochistan.

4. **P. scoparium,** *Schultz Bip. ex Schweinf. Beitr. Fl. Æthiop.* p. 153. Nearly glabrous shrub with ascending subvirgate branches, somewhat angular from the raised decurrent lines from the leaves. Leaves alternate, occasionally fascicled, linear or narrow-oval, acute, narrowed to sessile base, denticulate very narrowly decurrent, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{10}$–$\frac{1}{4}$ in. broad; revolute in vernation. Capitula widely cam-

panulate, ∞-flowered, ⅓ in. diameter, solitary on short axillary peduncles ¼–½ in. long, forming narrow leafy racemes. Scales of involucre multiseriate, much imbricated; inner narrowly linear-lanceolate, finely pointed, outer successively broader and shorter, subpatent or slightly recurved above. Receptacle plano-convex, naked. Ray-fl. filiform; mouth 4–5-dentate. Anther-base translucent-papillose. Achenes thinly pilose. Pappus sparse, tawny.—*Pluchea* (*Laggera*) *phagnaloides*, Hochst. in Hb. Schimp. Abyss. sect. ii. 685; *Blumea phagnaloides*, A. Rich. Fl. Abyss. i. p. 393.

Nile Land. Abyssinia, *Schimper*.

36. **ACHYROCLINE,** Less.; Benth. et Hook. f. Gen. Pl. ii. 305.

Capitula heterogamous, disciform, few-flowered, outer florets ♀, central 1–3, ☿. Involucre oblong or narrow-ellipsoidal (subcampanulate in *A. Hochstetteri*), scales pluriseriate, closely imbricate, scarious, coloured, glabrous or nearly so. Receptacle narrow, naked (or paleaceous). Corolla of ♂ fl. filiform, of ♀ fl. tubular 5-toothed. Anther-base tailed, tails cohering in pairs. Style-branches truncate papillose. Achenes "oblong slightly compressed;" pappus-setæ slender.—More or less frutescent, erect or loosely diffuse, hoary tomentose lanate or glabrescent. Leaves alternate, linear or ovate. Capitula small, yellowish whitish or pearly, in dense terminal rounded solitary or laxly panicled cymes.

A small genus chiefly of the New World.

Leaves linear strongly revolute . . . . . 1. *A. batocana.*
Leaves flat or but slightly revolute.
  Involucres golden or yellow . . . . . 2. *A. Hochstetteri.*
  Involucres white or tawny.
    Leaves linear.
      Achenes sessile-glandular. Leaves subacute . . . 3. *A. luzuloides.*
      Achenes glabrous. Leaves acuminate . . . . . 4. *A. glumacea.*
    Leaves ovate or oval.
      Leaves petiolate. Straggling shrub . . . . . 5. *A. Schimperi.*
      Leaves sessile. Erect herb . . . . . 6. *A. sclerochlæna.*

1. **A. batocana,** *O. & H.* Shrubby; branches subvirgate terete closely tomentose and leafy above. Leaves scattered, narrowly linear, acute, sessile, not narrowed at the base, pale-tomentose beneath, glabrous and shining above, 1-nerved, ½–1 in. long, margin revolute. Capitula oblong, slender, about 5-flowered, ⅙–⅕ in. long, subsessile in dense corymbose cymes 1½ in. diameter. Scales of involucre multiseriate, imbricate, yellowish, shining, glabrous, obtuse; innermost ovate-oblong or -lanceolate, scarious; outer successively shorter.

South Central. Batoka Country, *Dr. Kirk!*

A specimen from Inhambane, Mozamb. Distr., collected by Dr. Peters, may belong to this species; it differs, however, by a more branched more widely spread and less dense corymbose inflorescence. (*A. Steetzii*, Vatke in Oest. Bot. Zeitschr. xxvii. 194 (1877).)

2. **A. Hochstetteri,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. i. n. 237. Erect, branched from the base, 1½–4½ ft. high, more or less whitish-lanate throughout; branches virgate, subalate. Leaves linear or oval-linear, very acute, more or less narrowed to sessile (or lower

quasi-petiolate) decurrent base, 1–3-nerved, subentire, 2–4 in. long by $\frac{1}{10}$–$\frac{1}{2}$ in. wide. Capitula campanulate-oblong, 5–6-flowered, $\frac{1}{8}$ in. long by $\frac{1}{16}$ in. thick, golden yellow, sessile, crowded many together, in dense branched terminal cymes $1\frac{1}{2}$–6 in. diameter. Scales of involucre imbricated, obtuse, glabrous. Receptacle foveolate, fimbrilliferous. ☿ fl. 1–2; ♂ fl. 3–4. Achenes oblong, obtusely angled, minutely glandular-papillose.—A. Rich. Fl. Abyss. i. p. 429; *Gnaphalium Hochstetteri*, Schultz Bip. l.c.

Abyssinian names, *Subhinaday, Cascaso.*

Upper Guinea. Fernando Po, Clarence Peak, 8500 ft. alt., *Mann!* Cameroon Mountains, 7000–8000 ft. alt., *Mann!*

Nile Land. Abyssinia, *Schimper! Roth! Q. Dillon and Petit! Plowden!*

3. **A. luzuloides,** *Vatke in Oesterr. Bot. Zeitschrift*, 1875, p. 326. Shrubby below; stems slender, terete, white-lanate, at length glabrate, leafy up to 3–4 in. from inflorescence. Leaves linear or linear-oblong, subacute, slightly narrowed below to sessile subamplexicaul base, white-lanate beneath, less so or glabrate above, entire, 1–$2\frac{1}{2}$ in. long by $\frac{1}{6}$–$\frac{1}{3}$ in. wide. Capitula oblong, $\frac{1}{5}$ in. long by $\frac{1}{20}$ in. diameter, 4–8-flowered, sessile or subsessile, crowded in dense hemispherical terminal pedunculate cymes $\frac{3}{4}$–1 in. diameter. Scales of involucre glabrous, white, shining; inner linear-lanceolate, acute; outer lanceolate or oval, successively shorter and less acute. Receptacle naked. ☿ fl. 1–3, ♀ fl. 3–5. Achenes sessile-glandular, otherwise glabrous.—Vatke in Linnæa xxxix. p. 489 (1875), ex parte; *Gnaphalium luzuloides*, Schultz Bip. in Hb. Schweinf. Nub. n. 347; and in Schweinf. Beitr. Fl. Æthiop. p. 149.

Nile Land. Nubia, Soturba, *Dr. Schweinfurth!* between Suakin and Berber, *Dr. Schweinfurth!* Abyssinia, *Hildebrandt!* ($1\frac{1}{2}$–2 ft. high), *Beccari fide* Vatke in Oesterr. Bot. Zeitschrift l.c.

4. **A. glumacea,** *O. & H.* Erect, branched above, shrubby below, $\frac{1}{2}$–2 ft. high. Upper branches terete, more or less hoary-lanate, glabrescent, leafy except near inflorescence, often virgate. Leaves narrow-linear, acute, apiculate, somewhat narrowed below to the sessile base, lanate beneath, less so or glabrate above, entire, 1–4 in. long by $\frac{1}{12}$–$\frac{1}{4}$ in. wide. Capitula campanulate-oblong or oblong, $\frac{1}{6}$ in. long by $\frac{1}{16}$–$\frac{1}{12}$ in. wide, 5–8-flowered, sessile or on very short pedicels, crowded many together in branched corymbose or globose cymes $\frac{1}{2}$–$2\frac{1}{3}$ in. diameter. Scales of involucre glabrous shining, white or lower pale yellowish, persistent; inner linear or linear-lanceolate, acute; outer oval, subacute or obtuse, successively shorter. ☿ fl. 1–3. ♀ fl. 4–5. Achenes glabrous.—*A. luzuloides*, Vatke in Linnæa xxxix. p. 489 (1875), ex parte; *Helichrysum glumaceum* (? DC. Prodr. vi. p. 197), A. Rich. Fl. Abyss. i. 427.

? Upper Guinea. Senegambia, *Perrottet.*

Nile Land. Abyssinia, *Schimper! Petit!* Red Sea, *Dr. Nimmo! Lord!*

5. **A. Schimperi,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 393. Loose straggling herb 2–6 ft. high, hoary-tomentose, branches terete.

Leaves ovate or oval, acute, narrowed at the base, obscurely crenulate, petiolate, 1½–2 in. long by ½–1½ in. wide, uppermost smaller. Capitula campanulate-oblong, ⅛ in. long, 4–5-flowered, sessile, crowded in dense corymbose or globose cymes terminating the stem and branches. Scales of involucre pauciseriate, imbricated, scarious, shining, whitish; inner oval-oblong, subobtuse, glabrous, subherbaceous below; outer ovate, acute or subacute, woolly below, often purplish at base. Receptacle narrow, naked. Achenes glabrous.—A. Rich. Fl. Abyss. i. p. 428; *A.* (*Gnaphalium*) *adoënsis*, Schultz Bip. in Hb. Schimp. Abyss. sect. i. n. 41; *Gnaphalium Schimperi*, Schultz Bip. l.c. i. n. 393; *Gnaphalium*, sp., n. 1, Thoms. in Speke Journ., App. p. 638.

Abyssinian name *Subhinaday*.
Nile Land. Abyssinia, *Schimper! Roth!* Karagué, *Speke and Grant!*
Mozamb. Distr. Manganja Hills, *Dr. Meller!*

6. **A. sclerochlæna,** *Schultz Bip. mss. in Hb. Berol.* Erect, branched, lanate-tomentose, perennial herb 2½ ft. high; branches terete ascending. Leaves oval or oblong, subapiculate, sessile, scarcely narrowed to the amplexicaul base, 1–2 in. long by ⅜–¾ in. wide, densely lanate beneath, less so above. Capitula oblong, ¼ in. long, 8–9-flowered, sessile, in dense subglobose branched terminal rounded cymes about 2 in. diameter. Scales of involucre about 12, of nearly equal length, pauciseriate, loosely appressed, subacute, shining, of pale straw colour, scarious above, more coriaceous below; inner linear-oblong, glabrous; outer oval or ovate-oblong, woolly at base outside. Receptacle naked, small. ♀ fl. 5–6; ☿ fl. 3. Achenes glabrous, somewhat compressed. Pappus scabrous, white.—Vatke in Linnæa xxxix. p. 489 (1875); *Gnaphalium sclerochlænum*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 149, n. 778.

Nile Land. Abyssinia, *Schimper!*

37. **GNAPHALIUM,** L.; Benth. et Hook. f. Gen. Pl. ii. 305.

Capitula heterogamous, discoid, outer florets ♀ 2–∞-seriate, disk-florets fewer 1–15 ☿. Involucre campanulate or ovoid of 2–3-multiseriate more or less scarious imbricate white yellowish or brown bracts, outer usually shorter. Receptacle naked or minutely fimbrilliferous. Female florets filiform. Anther-base sagittate, finely tailed. Achenes subterete or slightly compressed, pappus uniseriate setaceous. —Herbaceous (or frutescent) woolly or tomentose, with alternate entire leaves, and clustered or variously cymose, rarely solitary, capitula.

A large widely dispersed genus, including some almost cosmopolitan species.

Leaves all sessile and more or less amplexicaul.
- Involucre of a dark brown colour . . . . . 1. *G. melanosphærum.*
- Involucre of a straw colour.
  - Hermaphrodite florets 1–3 in each capitulum . . 2. *G. Petitianum.*
  - Hermaphrodite florets 4–5 in each capitulum.
    - Leaves auriculate at the base . . . . . 3. *G. auriculatum.*
    - Leaves semi-amplexicaul, not auriculate . . . 4. *G. luteo-album.*

Involucral scales white at the tip.
- Leaves flattened, linear.

Capitula in broad corymbose cymes. Leaves glabrate above	5. *G. Steudelii.*
Capitula in subglobose clusters of $\frac{1}{3}$–1 in. diam. Leaves cottony on both sides	6. *G. Unionis.*
Leaves subterete, narrowly linear	7. *G. stenophyllum.*
Leaves attenuate at the base into the short petiole, or only the upper leaves sessile. Capitula in subglobose clusters	8. *G. pulvinatum.*
Capitula in spike-like clusters. Branches numerous. Capitula $\frac{1}{8}$ in. long	9. *G. niliacum.*
Simple or simply branched from the crown of the root. Capitula $\frac{1}{8}$ in. long	10. *G. purpureum.*

1. **G. melanosphaerum,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 1360. Annual, prostrate and branching at base, 3–6 in. high. Branches decumbent, 4–9 in. long, terete, obscurely striate, cottony. Leaves linear or spathulate, obtuse or subacute, sessile, more or less amplexicaul, 1–2 in. long by $\frac{1}{8}$–$\frac{1}{4}$ in. wide, tomentose on both sides, entire or nearly so. Capitula campanulate, $\frac{1}{8}$ in. long, subsessile in dense, globose, terminal and subterminal, pedunculate or subsessile clusters, $\frac{1}{3}$–$\frac{2}{3}$ in. diameter. Scales of involucre 2–3-seriate, nearly equal, oblong oblanceolate-oblong or oval-oblong, obtuse, dark brown; outer woolly at base. Receptacle naked, tubercled. ☿ fl. about 6. Achenes microscopically papillose, otherwise glabrous.—A. Rich. Fl. Abyss. i. p. 431.

Nile Land. Abyssinia, *Schimper!*

2. **G. Petitianum,** *A. Rich. Fl. Abyss.* i. p. 429. Stout much-branched herb, a few feet in height; branches subterete, evanescent-lanate below, lanate and more or less alate above. Leaves elongate-linear-lanceolate, acute, sessile, widely decurrent at the base, thinly albido-tomentose or -lanate beneath, slightly scabrid above, vaguely crenulate or subentire, ranging up to 4 in. long by $\frac{1}{2}$ in. wide or more. Capitula campanulate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, many-flowered, on short unequal pedicels in dense corymbose often panicled cymes cottony beneath 2–3 in. diameter. Scales of involucre pauciseriate, falling short of the florets, obtuse; outer and intermediate woolly, elliptic- or obovate-oblong; innermost linear-oblanceolate or linear, scarious above coriaceous below. Receptacle rather prominent, shortly fimbrilliferous. ☿ fl. 1–3. ♀ fl. numerous; mouth of corolla strongly toothed. Achenes small somewhat obovoid, microscopically papillose, otherwise glabrous.

Nile Land. Abyssinia, *Petit! Schimper!*

3. **G. auriculatum,** *A. Rich. Fl. Abyss.* i. p. 430, *non Thunb.* Herb with elongate simple terete striate branches, 1½–2 ft. long or more, thinly lanate above, more or less glabrate below. Leaves linear-lanceolate acute, sessile, amplexicaul with ample obtuse auricles, thinly hoary-lanate beneath, glabrescent above, 1½–3 in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, subentire. Capitula campanulate, many-flowered, $\frac{1}{8}$–$\frac{1}{7}$ in. long, subsessile, in dense, many-headed, branched, corymbose, lanate cymes

3–4½ in. wide. Scales of the involucre pauciseriate; inner linear or linear-oblong, slightly dilated above, quite obtuse, glabrous, straw-coloured; outer oval, rounded, thinly woolly at base. Receptacle narrow, prominent, foveolate, dentate. ☿ fl. 3–5. Achenes obovoid, glabrous, somewhat compressed.

Nile Land. Abyssinia, *Petit!*

4. **G. luteo-album,** *Linn.; DC. Prodr.* vi. p. 230. Herbaceous, sometimes woody at base, erect ascending or decumbent, simple or branched, ½–1½ ft. high. Stem and branches cottony, striate, subterete. Leaves spathulate, obtuse, or linear and sometimes acute, sessile, semi-amplexicaul, cottony on both sides, especially beneath, sometimes glabrate above, entire or vaguely crenulate, 1–3 in. long by $\frac{1}{12}$–$\frac{2}{3}$ in. wide; upper smaller. Capitula campanulate, many-flowered, $\frac{1}{3}$ in. long, sessile or subsessile, many together without intervening leaves, in crowded clusters at the ends of the stem and branches and from the upper axils, in corymbose or somewhat elongate cymes. Scales of involucre pauciseriate, straw-coloured; innermost linear obtuse or subacute; intermediate ovate-lanceolate, obtuse; outer ovate, obtuse, woolly at base. Receptacle naked, flat, closely tubercled, $\frac{1}{16}$ in. diam., ☿ florets 4–9. Achenes oblong, subterete or slightly compressed, minutely papillose, otherwise glabrous.

Upper Guinea. Niger Expedition, *Barter!* Senegambia, *Perrottet!*
Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit!* Nubia, *Kotschy! Bromfield!*

A cosmopolitan weed.

5. **G. Steudelii,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 231. Herbaceous, erect, simple or branching at base, usually branched above, ½–2 ft. high. Branches erect or ascending, terete, striate, cottony above, leafy. Leaves linear, acute, somewhat auricled and amplexicaul at the base, closely lanate beneath, nearly glabrate above, entire, 1–3 in. long, $\frac{1}{12}$–$\frac{1}{6}$ in. broad. Capitula campanulate, ⅛ in. long, subsessile, several together, in dense clusters arranged in broad terminal corymbose cymes. Innermost involucral scales linear or linear-oblanceolate, with acute or subacute whitish membranous appendices; intermediate linear-oblong, obtuse; outer obovate-oblong, obtuse, woolly. Receptacle naked, flat; ☿ florets about 5; ♀ florets very numerous, filiform, minutely toothed. Achenes very small, glabrous, obtusely angular.—*Helichrysum Steudelii,* Schultz Bip. *l. c.*; A. Rich. Fl. Abyss. i. p. 421.

Abyssinian name, *Subhinaday.*
Nile Land. Abyssinia, *Schimper! Parkyns!*
Mozamb. Distr. Manganja hills, *Dr. Meller!*

6. **G. Unionis,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. i. n. 175, ii. 1179. Annual herb, occasionally creeping and rooting, prostrate or ascending, branched from the crown of the root, lanate, 1 in.–1 ft. high. Leaves linear, subacute or obtuse, mucronulate, sessile, subamplexicaul, entire, lanate on both surfaces, ½–1 in. long by $\frac{1}{16}$–$\frac{1}{6}$ in.

wide. Capitula campanulate, $\frac{1}{10}$–$\frac{1}{8}$ in. long, crowded in terminal sessile subglobose often involucrate or shortly pedunculate clusters, $\frac{1}{3}$–1 in. diam. Scales of involucre sub-triseriate; inner linear or linear-oblanceolate, subacute or obtuse, white at tips; outer ovate or ovate-lanceolate, subacute or obtuse, woolly outside at base. ♂ florets 6–8–15. Achenes minutely papillose. — Schultz Bip. in Beitr. Schweinf. Fl. Æthiop. p. 150; *G. uliginosum*, A. Rich. Fl. Abyss. i. p. 431, non Linn.; *G. nubicum*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 149 (form with elongated procumbent rooting branches and often obtuse outer involucral scales).

Nile Land. Abyssinia, *Schimper! Roth!* Cordofan, *Kotschy!*

Differs from *G. uliginosum*, Linn., by the white tips of the inner scales of the involucre.

7. **G. stenophyllum,** *O. & H.* Cæspitosely branched. Branches decumbent, woody-wiry, dark-ashen, and rooting below, whitish and leafy above. Leaves narrowly linear-needleshaped, fleshy, subterete, acute or apiculate, sessile, subfalcate, $\frac{2}{5}$–$\frac{4}{5}$ in. long; marginal lines approximated, white, closely cottony, decurrent. Capitula $\frac{1}{3}$ in. long, campanulate-oblong, clustered a few together at the ends of the leafy branches. Involucres cottony below, glabrous, dilated and white above; inner scales linear-oblong, obtuse, white and spreading towards the tip. Female florets in many rows, outer; hermaphrodite florets central, about 12. Anthers tailed. Pappus uniseriate, whitish, silky, abont $\frac{1}{8}$ in. long, nearly equalling the florets, deciduous in one piece; setæ somewhat branched above. Achenes glabrous.—*Anaxeton septentrionalis*, Vatke in Oest. Bot. Zeitschr. xxvii. 194 (1877).

Mozamb. Distr. Inhambane, in dry sandy fields, *Peters!*

8. **G. pulvinatum,** *Del.; DC. Prodr.* vi. p. 231. Diffuse or prostrate annual, lanate-tomentose all over; branches numerous, spreading, slender, terete, 3–5 in. long. Leaves spathulate, more or less obtuse, mucronate, attenuate at the base into the short petiole, $\frac{1}{3}$–$\frac{3}{5}$ in. long. Capitula campanulate, $\frac{1}{8}$ in. long, crowded in subglobose leafy or involucrate terminal clusters, abont $\frac{1}{2}$ in. diam. Scales of involucre sub-triseriate, lanate, linear-lanceolate, subacute, membranous; inner a little longer than the florets, scarious, whitish or purplish at the apex. ♂ florets 4–6. ♀ numerous. Achenes glabrous or nearly so.

Nile Land. Cordofan, *Kotschy!* White Nile, *Schweinfurth!*

Occurs also in Egypt, and according to Boissier, Fl. Orient. iii. p. 225, also in Scind and India.

9. **G. niliacum,** *Raddi; DC. Prodr.* vi. p. 231. Diffuse annual, 3–10 in. high, branched at the base, thinly cottony in most parts; branches rather numerous, spreading, decumbent or ascending. Leaves spathulate or obovate, rounded or obtuse, mucronulate attenuate at the base into the short petiole, lanate especially on the margins and beneath, sometimes glabrate above, $\frac{3}{4}$–$1\frac{1}{2}$ in. long. Capitula campanulate, $\frac{1}{8}$ in. long, sessile in small dense terminal and subterminal shortly spiciform sessile clusters. Scales of involucre

2–3-seriate; inner oval-oblong, subacute, nearly glabrous; outer lanate, shorter, margins scarious, midrib green not reaching the apex. ☿ florets 4–5. ♀ florets very numerous. Achenes oblong, slightly compressed, papillose-glandular, otherwise glabrous.

Upper Guinea. Senegambia, *Perrottet!*

Nile Land. Nubia, *Bromfield!* Sennaar, *Kotschy!* Dar-Fertit, *Schweinfurth!*

Occurs also in Egypt. It is united by Boissier, Fl. Orient. iii. p. 226, with the Indian species *G. indicum*, Linn.—*G. gracillimum*, Perr. ex D.C. l. c. 232, may be a state of *G. niliacum*.

10. **G. purpureum,** *Linn.; DC. Prodr.* vi. p. 232. Herb, 6–12 in. high, simple or branched from the crown of the root; branches ascending, usually simple, thinly appressed lanate-tomentose. Leaves spathulate to linear-oblong, rounded or obtuse at the apex, mucronulate, upper rarely subacute, attenuate at the base or upper slightly so, sessile or lower narrowed into the winged petiole, thinly appressed-lanate beneath, nearly glabrate above, with few delicate veins, membranous, ranging up to 4 in. long by 1 in. wide. Capitula campanulate, $\frac{1}{6}$ in. long, sessile, several together in subglobose terminal subterminal and axillary clusters, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. arranged in terminal leafy spikes. Inner involucral scales linear-oblong, obtuse, scarious; outer ovate-oblong, acute, lanate. Receptacle nearly flat, naked or minutely papillose, $\frac{1}{16}$ in. diam. ☿ florets 4–; ♀ florets very numerous. Achenes oblong, slightly compressed, yellowish, nearly or quite glabrous.

Mozamb. Distr. Quilimane, Zambesi, *Kirk!*

Widely spread both in the Old and New Worlds.

UNKNOWN SPECIES.

Gnaphalium itinerarii, Schultz Bip. ex Hochst. in Flora, 1841, i. App. p. 27, n. 175 *b*, is unknown to us.

38. HELICHRYSUM, Gaert.; Benth. et Hook. f. Gen. Pl. ii. p. 309.

Capitula heterogamous, discoid, outer florets ♀ few or pauciseriate or in a few species more numerous than the central ☿ florets, or florets all ☿. Involucre campanulate oblong or hemispherical; bracts multiseriate or more rarely pauciseriate, scarious, coloured, erect or more or less spreading. Receptacle naked or fimbrilliferous, smooth or foveolate. Pistillate florets filiform. "Anther-base sagittate appendiculate. Achenes small terete angled or but slightly compressed." Pappus barbellate.—Herbaceous or frutescent, generally more or less lanate or tomentose, with entire usually alternate leaves and solitary or variously cymose small medium or rather large capitula, often conspicuous from the white straw-yellow or rose-colour of the involucral scales.

A large Old World genus especially numerous at the Cape and in Australia. Most of the following species appear to be peculiar to Tropical Africa.

Receptacle naked or shortly dentate.

Florets all hermaphrodite.

Capitula small, crowded in clusters.

Capitula sessile, in globose heads.
1–1½ ft. high . . . . . 1. *H. pachyrhizum.*
1–1½ in. high . . . . . 2. *H. rosulatum.*
Capitula sessile or subsessile, in branched cymes.
Capitula oblong. Leaves elliptical . . . 3. *H. Nimmoanum.*
Capitula campanulate. Leaves obovate . 4. *H. auriculatum.*
Capitula globose. Leaves linear-oblong . 5. *H. Quartinianum.*
Capitula solitary or subsolitary or 3–4 together, large or if small on slender peduncles.
Capitula small, on slender peduncles . . . . 6. *H. gracilipes.*
Capitula not small.
Spinous.
Involucral scales scarious . . . . . 7. *H. citrispinum.*
Involucral scales straw-coloured . . . 8. *H. horridum.*
Not spinous.
Involucre straw-coloured.
Capitula solitary.
Capitula ½–⅔ in. long.
Leaves lanceolate . . . . . 9. *H. Petersii.*
Leaves linear-lanceolate . . . . 10. *H. Kirkii.*
Capitula 1 in. long . . . . . 11. *H. Newii.*
Capitula clustered, 3–4 together . . . 12. *H. nitens.*
Involucre purplish or white.
Achenes thinly pubescent . . . . . 13. *H. elegantissimum.*
Achenes glandular . . . . . 14. *H. adenocarpum.*
Florets not all hermaphrodite.
♀ florets few.
Capitula solitary, white . . . . . 15. *H. argyrosphærum.*
Capitula clustered, yellow . . . . . 16. *H. abyssinicum.*
♀ florets ∞.
Branches narrowly alate . . . . . 17. *H. biafranum.*
Branches not alate . . . . . 18. *H. fœtidum.*
Receptacle with conspicuous fimbrillæ.
Florets all hermaphrodite.
Tips of involucral scales straw-coloured . . . . 19. *H. gerberæfolium.*
Tips of involucral scales white.
Inflorescence globose, not umbellate . . . . 20. *H. undatum.*
Inflorescence corymbose, umbellate . . . . . 21. *H. oxyphyllum.*
Hermaphrodite florets 1–5; the rest ♀.
Leaves lanceolate or linear, all sessile . . . . 22. *H. cymosum.*
Leaves narrowly elliptical, lower petioled . . 23. *H. globosum.*

1. **H. pachyrhizum,** *Harv. in Harv. et Sond. Fl. Cap.* iii. p. 222. Erect herb from a suffruticose base, 1–1½ ft. high; branches numerous, erect or ascending, subvirgate, terete, leafy, whitish-tomentose above, often subglabrate below. Leaves linear oblong or spathulate, obtuse or subacute, mucronate, sessile, semi-amplexicaul, white-lanate-tomentose, ½–2 in. long by $\frac{1}{16}$–¼ in. wide; margins entire, often revolute. Capitula campanulate, ¼ in. long, 20–22-flowered, sessile or subsessile, crowded several together in globular clusters ½–1 in. diam., loosely corymbose at ends of the branches. Flowers all hermaphrodite. Scales of involucre pluriseriate, loosely imbricated, hyaline except green subcoriaceous midrib near base, acute, glabrous; innermost acuminate, lanceolate above, spathulate below; outer and intermediate oblong to oblanceolate-oblong, often crimson about middle; outer imbedded at base in fine white wool. Receptacle small, prominent, naked or with

few minute teeth. Achenes small, oblong, covered with small sessile glands, glabrous. Pappus scabrid. Florets all ☿.

South Central. Batoka Country, *Dr. Kirk!* Mashona Country, *T. Baines!*

Occurs also south of the Tropic.

A single specimen in Hb. Kew, very young from Little Fish Bay, West Coast, 15° S. lat., collected by I. H. B. Thwaites, may belong to this species.

2. **H. rosulatum,** *O. & H.* Short, stout, perennial, procumbent, with white tomentose stems 1½ in. high, suffruticose at base; ascending stems simple or branched at base, terete. Leaves spathulate-oblong, obtuse, emarginate, slightly narrowed at the sessile base, coriaceous, glabrous, with 3–5 depressed veins above, appressedly velutinous and milk-white beneath, crowded at base of branches, ½–⅘ in. long by ⅛–3/16 in. wide, upper smaller; margins entire, finely revolute. Capitula narrowly campanulate, 6–7-flowered, ⅙ in. long, sessile, many together in a subglobular head ½–⅔ in. diam., leafy at the base. Scales of the involucre pauciseriate, slightly purplish near tip, scarious with green midrib below; inner linear slightly dilated above, obtuse, glabrous; outer similar but smaller, thinly cottony outside. Florets all hermaphrodite. Achenes very nearly glabrous.

Nile Land. Shores of the Red Sea, *Nimmo!*

3. **H. Nimmoanum,** *O. & H.* Suffruticose, branched; branches terete, albido-tomentellous above, glabrescent, 8 in. or more long. Leaves narrowly elliptic or ovate, subacute or subobtuse, apiculate, somewhat narrowed at the base, shortly petiolate, entire, indistinctly pinnate-veined, white-tomentellous especially beneath, ½–1¼ in. long by 1/6–½ in. wide; petiole ⅛–⅕ in. long. Capitula oblong, 8–10-flowered, ⅓ in. long on very short pedicels, in moderately dense branched terminal corymbs 1–2½ in. diam. Scales of the involucre pluri- (sub 4-) seriate, imbricate, unequal, glabrous, straw-coloured; inner linear-oblong, obtuse, with scarious margins; outer successively shorter and more elliptic. Receptacle naked. Florets all hermaphrodite. Achenes oblong minutely glandular.

Nile Land. Shores of the Red Sea, *Nimmo!*

4. **H. auriculatum,** *Less.*; *DC. Prodr.* vi. p. 209. Herbaceous (?). Branches terete, albido-lanate, with sparse foliage. Leaves obovate, obtuse, mucronulate, narrowed towards the base, sessile or lower shortly petioled, subamplexicaul, tomentose especially beneath, subentire or crenulate, 1–1¼ in. long by ½–⅔ in. wide. Capitula widely campanulate, ⅓ in. long, many-flowered, on short unequal pedicels, in dense globose or corymbose terminal clusters 1½–2½ in. wide. Scales of the involucre pluri- (3–4-) seriate, imbricate, pale, sometimes mucronulate; innermost spathulate, obtuse, glabrous; intermediate ovate or ovate-lanceolate, narrowed to base, glabrous, successively shorter; outer elliptical, obtuse, short, woolly at back outside. Receptacle naked. Florets all hermaphrodite. Achenes glabrous. Pappus coherent in minute basal ring, barbate.

Lower Guinea. Congo, *Barton!*

Mozamb. Distr. Manganja Hills, *Dr. Meller!* Shire, *Dr. Stewart!*

5. **H. Quartinianum,** *A. Rich. Fl. Abyss.* i. p. 427. Perennial herb, erect, albido-tomentose, 1½ ft. high; stems simple or nearly so, terete, with rather sparse leaves. Leaves linear-oblong, subacute, sessile, subamplexicaul, entire, 1–3 in. long by $\frac{1}{12}$–$\frac{3}{8}$ in. wide. Capitula hemispherical, about ½ in. diam., many-flowered, on short unequal pedicels, in dense globose cymes 2–3 in. diam. at the rather slender ends of the stems. Scales of the involucre multiseriate, imbricated, mostly 3-sulcate-nerved; inner linear acute, ⅓ in. long, glabrous, more coriaceous below; intermediate spathulate-oblong, glabrous, successively shorter; outermost ovate with basal woolly claw. Receptacle flat, $\frac{1}{6}$ in. diam., shortly fimbrilliferous, ultimately naked. Florets all ♀. Achenes oblong, 4–8-costate, truncate, glabrous, $\frac{1}{16}$ in. long. Pappus barbellate, uniseriate, connate at very base, slightly ruddy, slender.

Nile Land. Abyssinia, *Q. Dillon and Petit!*

6. **H. gracilipes,** *O. & H.* Procumbent surculose herb, rosulate at base, with filiform terete quickly glabrate branches 2–5 in. long. Leaves albido-tomentellous especially beneath, mucronulate, cauline distant, more or less elliptical, subacute or subobtuse, subsessile, narrowed at the base, $\frac{1}{8}$–½ in. long by $\frac{1}{12}$–¼ in. wide; radical approximated, obtuse or rounded, narrowed at base into petiole or in some forms cordate-reniform, $\frac{1}{6}$–$\frac{5}{8}$ in. long by $\frac{1}{8}$–$\frac{5}{8}$ in. wide; petioles $\frac{1}{8}$–$\frac{5}{8}$ in. long. Capitula campanulate, 20-flowered, ⅕ in. long, on slender glabrate peduncles ½–1 in. long at ends of principal branches or on shorter peduncles at ends of short axillary branches, solitary or subsolitary. Scales of the involucre pluri- (about 5-) seriate, straw-coloured, glabrous, acute; inner linear; outer successively shorter and more lanceolate. Receptacle naked. Flowers all hermaphrodite. Achenes thinly puberulous. Pappus white, barbate with patent bristles.

Nile Land. Red Sea, *Nimmo!*

7. **H. citrispinum,** *Del. in Ann. Sc. Nat. Ser.* ii. vol. xx. p. 93. Fruticose; branches divaricate, terete, pale-tomentose, leafy and spinous above. Leaves linear-lanceolate or oblong, obtuse or subacute, revolute, sessile, not narrowed at the base, often crowded in terminal tufts, incano-pubescent on both sides, about ⅓ in. long, upper often with axillary spines about ½ in. long. Capitula widely campanulate, $\frac{1}{3}$–½ in. long, solitary at the ends of the short leafy branches. Scales of involucre pluriseriate, scarions, lanceolate, subobtuse, coriaceous at base, outer shorter. Receptacle foveolate; margins of pits with toothed margins. Flowers all ♀. Corolla-lobes nigro-punctate. Achenes shortly pubescent; hairs shining.—*H. spinosum,* Schultz Bip. in Hb. Schimp. Abyss. Sect. ii. nn. 666, 1246; *Gnaphalium spinosum,* Schultz Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 173 (1845).

Nile Land. Abyssinia, *Schimper! Roth! Ferret and Galinier!* 11–13,000 ft. alt.

Gnaphalium crispatulum, Del. Fl. Ægypt. p. 123, t. 44, f. 3, an Egyptian species, is mentioned in Schultz Bip. and Aschers. Enum. p. 285, n. 2456, as occurring also in Nubia and Abyssinia. A specimen so named, belonging to the Berlin herbarium and seen by us, we regard as conspecific with *Helichrysum citrispinum,* Del.

8. **H. horridum,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 975. Shrubby, spinous; branches terete, floccose, lower glabrate; bark pallid; spines $\frac{1}{3}$–$\frac{5}{6}$ in. long, straight, axillary and terminal. Leaves approximated on young shoots, often subfasciculate, linear, acute, sessile, apiculate, tomentose especially beneath, $\frac{1}{4}$–$\frac{1}{3}$ in. long; margins entire, revolute. Capitula campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, solitary, terminating the numerous young branches, leafy at base. Scales of the involucre multiseriate, imbricate, straw-coloured; inner linear-oblong, obtuse, glabrous; outer successively shorter and rounder, thinly woolly outside at base. Receptacle naked, flat. Florets all apparently hermaphrodite. Achenes obscurely angular or subterete, with few minute scattered hairs.—A. Rich. Fl. Abyss. i. p. 422. *Gnaphalium horridum,* Schultz Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 173 (1845).

Nile Land. Abyssinia, *Schimper!*

9. **H. Petersii,** *O. & H.* Suffruticose at least below, 2 ft. high or more. Stems erect, pubescent with short weak spreading hairs; branches ascending, leafy throughout. Leaves lanceolate, acute at the apex by the recurving of the two sides, rounded at the sessile base, chartaceous, rather softly scabrid above, 5-nerved, hoary and velvety-pubescent beneath, ranging up to $1\frac{1}{4}$ in.; margins revolute. Capitula hemispherical, $\frac{1}{2}$ in. long, sessile at the extremity of the subcorymbose branches, based by the upper leaves. Scales of the involucre multiseriate, bright yellow, with ovate subobtuse mucronulate tips, glabrous. Florets all hermaphrodite. Receptacle areolate-foveolate, nearly flat, glabrous. Achenes glabrous, ovoid-oblong, about 5-ribbed. Pappus barbellate, yellowish.—*H. Kirkii,* Vatke in Oest. Bot. Zeitschr. xxvii. 195 (1877), non O. & H.

Mozamb. Distr. Zambesi-land, *Kirk!* Tette, *Peters!*

10. **H. Kirkii,** *O. & H. ex Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 95, t. 61. Suffruticose at the base, $1\frac{1}{2}$–2 ft. high or more, erect; branches virgate, terete, faintly striate, pubescent or tomentose, leafy above. Leaves (cauline) linear or linear-lanceolate, acute, apiculate, sessile, clasping, subauriculate, white-tomentose beneath, subglabrescent above; margins revolute, entire, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{20}$–$\frac{1}{4}$ in. wide. Capitula widely campanulate, very many-flowered, $\frac{1}{2}$–$\frac{2}{3}$ in. long and wide, singly terminating the upper often short leafy branches, forming loose corymbs. Scales of involucre multiseriate, imbricate, glabrous, shining, of a bright straw colour; inner linear, acute; intermediate oblong, narrowed at the apex, subacute; outer ovate, obtuse or subacute. Receptacle foveolate, nearly flat, glabrous. Florets all hermaphrodite. Achenes oblong, glabrous, of a milk-white colour, shining, obscurely 5–6-sided. Pappus barbellate, yellowish.

Mozamb. Distr. Manganja Hills, *Dr. Meller!* Soche Hill, *Dr. Kirk!* Shire, *Dr. Stewart!* ? Maravi Country, west of Lake Nyassa, 12° S. Lat., *Dr. Kirk!* 7° 40′ S. Lat., M'buiga, south of Coast range, *Speke and Grant!*

11. **H. Newii,** *O. & H.* Fruticose, leafy; branches (upper) terete, as well as the leaves covered with appressed silvery tomentum. Leaves linear-oblong, obtuse, mucronulate, revolute at the margins, sessile,

scarcely narrowed at the base, coriaceous, entire, $\frac{1}{4}$–$\frac{1}{2}$ in. long by $\frac{1}{12}$–$\frac{1}{8}$ in. wide. Capitula widely campanulate, about 1 in. long and wide, many-flowered, terminal, solitary, sessile. Scales of involucre multiseriate, loosely imbricate, glabrous; inner linear, narrowed to obtuse apex, $\frac{3}{4}$ in. long; outer lanceolate, gradually narrowed to subobtuse or subacute apex, successively shorter. Receptacle bracteate, with strongly acute-toothed pit-margins. Pappus barbellate above.

Mozamb. Distr. Kilima-njaro, highest zone of vegetation, *Rev. C. New!*

12. **H. nitens,** *O. & H.* Erect perennial, 6–9 in. high; stem simple, leafy below, terete, cottony. Leaves oval-lanceolate, acute, mucronate, sessile, clasping, tomentellous on both sides, especially beneath, faintly 3–5-nerved, entire, 2–4 in. long by $\frac{1}{2}$–$\frac{5}{6}$ in. wide, upper smaller. Capitula hemispherical, very numerously flowered, about 1 in. diameter, on short pedicels clustered 3–4 together at end of stem in subglobose cymes $1\frac{1}{2}$–$1\frac{3}{4}$ in. diameter. Scales of the involucre multiseriate, imbricate, shining, of orange colour; inner linear, subobtuse, glabrous, exceeding the fl.; outer successively shorter, subacute; outermost ovate, woolly at base outside. Receptacle flat, naked, $\frac{1}{3}$ in. diameter. Fl. all ☿. Achenes glabrous.

Native names, *Donéé, Ousiwa.*

Mozamb. Distr. Mount Chiradzura, 1,000 ft. to summit, *Dr. Meller!*

13. **H. elegantissimum,** *DC. Prodr.* vi. p. 179, var. *majus.* Erect strong perennial herb, 3 ft. high, simple or nearly so; stem terete, obscurely striate, lanate-pubescent above, glabrate below, leafy. Leaves ovate-oblong, obtuse or subacute, apiculate, sessile, wide clasping and somewhat decurrent at the base, tomentellous beneath, squamoso-asperulous above, marked with obscure longitudinal veins, entire, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long by $\frac{1}{2}$–$1\frac{1}{4}$ in. wide. Capitula hemispherical, very many-flowered, $1\frac{1}{4}$ in. diameter, solitary, on distinct peduncles, 1–$3\frac{1}{2}$ in. long, 4–8 in a terminal corymb, 3–6 in. diameter. Scales of the involucre pluriseriate, lanceolate, acuminate, glabrous, shining, hyaline above, more coriaceous and often purplish at base; inner linear-lanceolate, obtuse or subacute, white; outer shorter, often purplish, acute, spreading. Receptacle naked. Fl. all hermaphrodite. Achenes thinly pubescent, small. Pappus sordid, barbellate.—*H. formosissimum,* Schultz Bip. in Hb. Schimp. Abyss. sect. ii. n. 672; A. Rich. Fl. Abyss. i. p. 422. *Gnaphalium elegantissimum* et *G. formosissimum,* Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. 170, 173 (1845).

Nile Land. Abyssinia, *Schimper!* (var. *latifolium,* A. Rich. l. c.) *Ant. Petit.*

Occurs also south of the Tropic. Dr. Klatt, in Ann. Sc. Nat. ser. v. vol. xviii. p. 372, cites '*H. formosum,* Sch. Bip.' from Mount Bachil, Abyssinia, at 12,000 ft. alt., collected by Schimper Oct. 26, 1850; this name is unknown to us, it may mean *H. formosissimum.*

14. **H. adenocarpum,** *DC. Prodr.* vi. p. 180, var. *alpinum.* Erect simple perennial herb, 6–10 in. high, argenteo-lanate. Leaves oval-oblong obtuse or uppermost linear-lanceolate, acute, mucronate, sessile, amplexicaul, entire, densely lanate beneath, less so above, $\frac{1}{3}$–1 in. long by $\frac{1}{16}$–$\frac{3}{8}$ in. wide. Capitula 1–2, broadly campanulate,

very numerously flowered, nearly 1 in. long, at or near the extremity of the stem. Scales of the involucre pluriseriate, imbricated, glabrous and shining, mostly rose-purple; inner linear, acute; outer lanceolate, gradually narrowed, subacute, rather shorter. Receptacle . . Fl. all ☿ (?). Achenes glandular.—*Gnaphalium adenocarpum*, Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 170 (1845).

Mozamb. Distr. Kilima-njaro, highest zone of vegetation, *Rev. C. New!*
Occurs also south of the Tropic.

15. **H. argyrosphærum,** *DC. Prodr.* vi. p. 174. Diffuse or decumbent herb, much-branched from suffruticose stock; branches terete below, subangular above, more or less lanate, not or scarcely exceeding 6 in. long, leafy. Leaves spathulate, obtuse or subacute, mucronulate, sessile, subamplexicaul, upper subdecurrent, more or less lanate on both sides, entire, $\frac{1}{2}$–1 in. long by $\frac{1}{16}$–$\frac{1}{4}$ in. wide. Capitula widely campanulate or hemispherical, many-flowered, $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, solitary, subsessile, terminal. Scales of involucre pluriseriate, loosely imbricated, rounded or acuminate at apex, glabrous, hyaline, in some cases with reflexed tips; innermost linear-spathulate with coriaceous green midrib extending two-thirds distance up the scale; outer successively shorter and more elliptical. Receptacle naked. Florets hermaphrodite, few outer ones female. Achenes oblong, small, covered with small sessile glands.—*Gnaphalium argyrosphærum*, Schultz Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 170 (1845).

South Central. S. Lat. 23°, *Chapman and Baines!* Maravi Country, west of Lake Nyassa, 12° S. Lat. (Form with capitula $\frac{1}{2}$ in. diameter and acuminate, *Dr. Livingstone!* scales recurved at tip; possibly a distinct species.)
Occurs also south of the Tropic.

16. **H. abyssinicum,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. i. n. 127, ii. n. 663. Suffruticose, 9–18 in. high or more, branched above; branches subvirgate, terete, cottony above, leafy. Leaves linear or linear-oblong, subobtuse with short cartilaginous mucro, sessile, wide or scarcely narrowed at base, more or less densely tomentose on both sides especially beneath, entire, margins often revolute, $\frac{1}{3}$–$1\frac{1}{4}$ in. long by $\frac{1}{16}$–$\frac{1}{4}$ in. wide. Capitula campanulate, $\frac{1}{5}$ in. long, about 50-flowered, subsessile, crowded in dense globose or corymbose clusters, 1–3 in. wide at ends of branches. Scales of involucre pluriseriate, of primrose colour, shining; inner oblong-oblanceolate or oval-oblong, subacute or obtuse, glabrous; outer oblong or ovate, subacute, thinly woolly at base outside. Receptacle rather prominent, naked. ☿ fl. ∝, outermost ♀. Achenes minutely glandular, otherwise glabrous.—A. Rich. Fl. Abyss. i. p. 423. *Gnaphalium abyssinicum*, Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 174 (1845).

Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit! Roth!*
Mozamb. Distr. Kilima-njaro, highest zone of vegetation, *Rev. C. New!*
Very like *H. splendidum*, Less., but differs by more spreading leaves and less obtuse involucral scales.

17. **H. biafranum,** *Hook. fil. in Journ. Linn. Soc.* vii. p. 202. Tall erect slender herb, 10 ft. high. Branches virgate, terete, striate,

narrowly alate, shining, covered above with easily detached wool. Leaves elongate-linear-lanceolate, acute, sessile, decurrent, subentire, thinly and appressedly pale-tomentose or lanate beneath, scabrid and thinly lanate at length glabrate above, obscurely 3-nerved, ranging up to 4 in. long by $\frac{1}{3}$–$\frac{1}{2}$ in. wide. Capitula campanulate, many-flowered, $\frac{1}{6}$–$\frac{1}{5}$ in. long, gold-coloured, on short unequal lanate pedicels, in dense corymbose cymes 3–6 in. diameter. Scales of involucre 4–5-seriate, glabrous, yellow; innermost linear or linear-oblong, subacute or obtuse; outer elliptic-oblong, obtuse. Receptacle foveolate. ☿ fl. numerous, as well as the ♀ fl. Achenes oblong, subterete, nearly glabrous.—*Gnaphalium biafranum*, Benth. et Hook. f. Gen. Pl. ii. p. 306.

Upper Guinea. Cameroon Mountains, 7,000 ft. alt., *Mann!*

18. **H. fœtidum,** *Cass.; DC. Prodr.* vi. p. 187. A stout biennial herb, 1–4 ft. high, variable and widely spreading; stem erect, simple below, corymbosely branched above; branches glandulose-pubescent or tomentose above, terete, faintly striate. Leaves oblong-lanceolate, acute, apiculate, sessile, cordate-amplexicaul, flat, entire, white-tomentose beneath, scaberulous-subglabrate above, 1–5 in. long by $\frac{1}{3}$–1 in. wide. Capitula hemispherical, $\frac{1}{3}$–1 in. diameter, with very numerous florets, on short pedicels, densely crowded in corymbose or sometimes elongated cymes. Scales of the involucre multiseriate, golden yellow or cream-coloured, shining, glabrous, acute, subacute or subobtuse; inner rather exceeding the florets, linear, coriaceous below, scarious above; intermediate lanceolate-spathulate; outer ovate, subobtuse, shorter, woolly at base outside. Receptacle flat, areolate, naked. ♀ fl. very numerous. ☿ fl. numerous. Achenes oblong, very small, glabrous. Pappus barbellate.—Bot. Mag. tt. 1987, 5431. *H. glutinosum*, A. Br. in Flora xxiv. i. p. 277 (1841). *H. Mannii*, Hook. fil. in Journ. Linn. Soc. vi. p. 12. *Gnaphalium Buchingeri*, Schultz Bip.! in Schweinf. Beitr. Fl. Æthiop. p. 285. n. 2453. *G. fœtidum*, Linn. Sp. Pl. 851 (1753).

There are 3 forms of this species, varying chiefly in the size of the capitula and the denseness of the foliage.

Upper Guinea. Fernando Po and Cameroon Mountains, 4–13,000 ft. alt., *Mann!* Old Calabar!

Nile Land. Abyssinia, *Schimper! Petit! Roth!*

Occurs also south of the Tropic.

19. **H. gerberæfolium,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. i. n. 203. Perennial herb, 1–1½ ft. high; stem slender, terete, lanate, naked above; stock thick. Leaves narrowly elliptical, acute, acuminate, more or less cottony beneath and subglabrate above, narrowed at the base, 5-nerved; cauline sessile, clasping, 1–2 in. long by $\frac{1}{4}$–$\frac{1}{2}$ in. wide, upper lanceolate or linear; radical narrowed at base into cylindrical petiole, dilated and sheathing at base, ranging up to 6 in. long. Capitula campanulate, $\frac{1}{4}$ in. long, 30-flowered, on very short pedicels, in dense small globose clusters, forming a branched terminal cyme 2–2½ in. long by 1½–2 in. wide. Scales of the involucre pluriseriate, obtuse, of straw colour; innermost linear-oblong; intermediate oval-

oblong; outer oval, woolly at base outside. Receptacle fimbrilliferous. Achenes glabrous. Fl. all ☿. Pappus barbate, slightly connate at base into ring.—Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 174 (1845). A. Rich. Fl. Abyss. i. p. 425. *Gnaphalium gerberæfolium*, Sch. Bip. l. c.

Nile Land. Abyssinia, *Schimper!*

Mozamb. Distr. Near Sotchi, alt. 3,500 ft., *Dr. Kirk!* Shire (form with dense clusters of capitula and root-leaves about 7-nerved), *Dr Stewart!*

20. **H. undatum,** *Less.; DC. Prodr.* vi. p. 198. Erect appressed-whitish-tomentose perennial herb; stem simple, leafy below, 1½–4 ft. high. Lower leaves ovate-lanceolate or lanceolate, acute, narrowed into the petiole, thinly scabrid above, 3–5-nerved and shortly appressed-tomentose beneath; upper linear-lanceolate or linear-acuminate, tip in our specimens minutely revolute or cincinnate; lower 3½–5 in. long, 1–2 in. broad; petiole varying to 2 in. Capitula about ¼ in. diameter, collected in dense subhemispherical or corymbose umbelliform cymes 1–6 in. diameter, terminating the leafless extremities. Inner involucral scales loose or spreading, oblong or linear, obtuse, outer elliptical or ovate, rose-coloured above, cottony beneath. Only ☿ florets in our specimens, inserted on an alveolate receptacle with conspicuous orange-coloured fimbrillæ. Achenes glabrous.—Oliv. in Trans. Linn. Soc. Lond. xxix. t. 62.

North Central. Monbuttu-land, *Dr. Schweinfurth!*

Mozamb. Distr. Hills of Chogwe, 6° 51′ S. Lat., about 36½° E. Long., *Speke and Grant!* (*Antennaria*, sp. Speke, Journ. App. 638); Moramballa, 3,000 ft. alt., *Dr. Kirk!*

Occurs also in South Africa.

21. **H. oxyphyllum,** *DC. Prodr.* vi. p. 199. Stem straight, erect, terete, thinly lanate, faintly striate, 2½ ft. high or more, naked above, ¼ in. thick. Leaves linear-lanceolate, upper narrower, acutely acuminate, acicular at apex, sessile, auriculate, pale-tomentellous beneath, scaberulous and green above, lower 3-nerved, ranging to 6 in. long by ½ in. wide or more. Capitula widely campanulate, ¼ in. long, on short unequal pedicels, crowded in a dense corymbose terminal umbel 4¼ in. diameter, the primary rays of which are about 17 in number, 1–1½ in. long, lanate, with linear acute bracts at base about ¾ in. long. Scales of the involucre pluriseriate, imbricate; innermost linear-oblong, obtuse, white-opaque above; intermediate oblong, very obtuse, white-opaque above; outer oval, very obtuse, shorter, darker, woolly at base. Receptacle with long fleshy fimbrillæ. Fl. all hermaphrodite. Achenes glabrous.

Mozamb. Distr. Manganja Hills, *Dr. Meller!*

Occurs also south of the Tropic.

The above description is based upon Dr. Meller's specimen, which differs from the type by the remarkable umbelliferous inflorescence.

22. **H. cymosum,** *Less.; DC. Prodr.* vi. p. 202. Suffruticose, erect, much-branched, 1–4 ft. high; branches virgate, terete, tomentose above, glabrate below, leafy. Leaves lanceolate or linear, acute, sessile, cordate-amplexicaul, woolly especially beneath, entire, margins often

revolute, $\frac{1}{3}$–1 in. long by $\frac{1}{20}$–$\frac{1}{4}$ in. wide. Capitula campanulate-oblong, $\frac{1}{12}$ in. long by $\frac{1}{16}$ in. wide, 10–20-flowered, subsessile, crowded in dense corymbose-globose cymes. $\frac{3}{4}$–$1\frac{1}{2}$ in. diameter. Scales of the involucre pauciseriate, unequal, imbricate, of a shining deep straw colour; inner oblong or linear-oblong, obtuse or eroded at tip, coriaceous below; outer broadly ovate or elliptical, thinly woolly outside. Receptacle with conspicuous subulate orange-coloured fimbrillæ exceeding the ovaries. Carpels glabrous. ☿ fl. 4–7.—*H. chrysocoma*, Schultz Bip. in Hb. Schimp. Abyss. ii. nn. 836, 979. A. Rich. Fl. Abyss. i. p. 424. *Gnaphalium fruticosum*, Forsk.! Fl. Æg.-Arab. p. 218. *H. chrysocephalum*, Schultz Bip. l. c. iii. 1765. *Gnaphalium chrysocephalum* et *G. chrysocoma*, Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 174 (1845). *H. fruticosum*, Vatke in Linnæa xxxix. p. 491. cum. varr.

Upper Guinea. Fernando Po and Cameroon Mountains, 7–11,000 ft. alt., *Mann!*

Nile Land. Abyssinia, *Schimper! Roth!*

Mozamb. Distr. Kilima-njaro, *Rev. C. New!*

Occurs also in South Africa, Arabia, etc.

23. **H. globosum,** *Schultz Bip. in Hb. Schimp. Abyss.* ii. n. 988. Perennial herb, $\frac{1}{2}$–$2\frac{1}{2}$ ft. high; stems simple from the thick root-stock, erect, more or less lanate, naked above. Leaves 3-nerved, albido-tomentellous beneath, squamous-scaberulous above, entire, narrowly elliptical, acutely acuminate; cauline distant, narrowed towards the auriculate amplexicaul base, sessile or lowest quasi-petiolate, ranging up to 3–6 in. long by $\frac{1}{2}$–$1\frac{1}{2}$ in. wide; radical approximated, attenuate at base into petiole $\frac{1}{2}$–4 in. long. Capitula oblong, 12–18-flowered, $\frac{1}{5}$–$\frac{1}{4}$ in. long, on very short pedicels crowded in dense subglobose terminal clusters 1–2 in. diameter; occasionally the cluster is broken up into smaller subordinate globular clusters. Scales of the involucre pauciseriate, brownish yellow; inner oblong obtuse, coriacous below, glabrous; outer shorter broadly elliptical, obtuse, lanate below. Receptacle with orange fimbrillæ. ☿ fl. about 4, the rest ♀. Achenes oblong terete glabrous. Pappus cohering slightly in basal ring.—A. Rich. Fl. Abyss. i. p. 425; *Gnaphalium globosum*, Sch. Bip. in Mohl et Schlecht. Bot. Zeit. iii. p. 174 (1845).

Upper Guinea. Fernando Po and Cameroon Mountains, 5–10,000 ft. alt., *Mann!*

Nile Land. Abyssinia, *Schimper!*

Var. *β. rhodochlamys*, Vatke in Linnæa xxxix. p. 492 (1875). Herbaceous, $2\frac{1}{2}$–3 ft. high, simple erect, shortly pale-tomentose above, puberulous and shining below. Stem striate. Leaves elliptical oblanceolate elongate-lanceolate or uppermost linear, acute, upper very much so, lower with fine obtuse point, 1–5-nerved, membranous, shining, 2–$4\frac{1}{2}$ in. long by $\frac{1}{8}$–$1\frac{1}{2}$ in. wide; cauline sessile, amplexicaul; radical attenuate into petiole. Capitula campanulate-oblong, $\frac{1}{6}$–$\frac{1}{5}$ in. long, 13–17-flowered, bright purple, sessile or subsessile in dense branched subglobose terminal panicles $2\frac{1}{4}$ in. diameter. Scales of the involucre pluriseriate, glabrous, shining, purple above; inner oblong, obtuse, minutely denticulate at apex; outer oval, acutish, shorter. Receptacle with long jagged coloured fimbrillæ equalling or exceeding the ovaries. ☿ fl. 1–3. ♀ fl. 12–14. Achenes glabrous, subterete.

Nile Land. Abyssinia, *Schimper!* a. 1863, n. 1122.

39. **LEYSERA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 327.

Capitula heterogamous, radiate; florets all or mostly fertile; those of the ray female, in one row, those of the disk hermaphrodite. Involucre turbinate-campanulate; bracts in several rows, imbricated, dry; the outer ones successively shorter. Receptacle flat, naked or nearly so in our species. Corolla of the ray-florets narrowly ligulate, of the disk-florets narrowly tubular, regular, shortly 5-cleft. Anther-base sagittate; auricles minute, very narrowly tailed. Style-branches narrow obtuse. Achenes narrow, angular. Pappus consisting of short paleæ connate at the base and of a few long outer plumose setæ.—Rigid or slender herbs or undershrubs with narrow entire crowded leaves and yellow flowers.

A small genus, all South African, except the following.

1. **L. discoidea,** *Cass. in Dict. Sc. Nat.* xxvi. p. 79 (1823). A slender somewhat glandular-scabrid shining annual, branched from the crown of the root, 3–6 in. high. Leaves narrowly linear or filiform, ranging up to 1 in. long. Capitula $\frac{1}{3}$–$\frac{1}{2}$ in. long, solitary, on slender divaricate subterminal peduncles of 1–$2\frac{1}{2}$ in. long. Involucral bracts obtuse, linear or the outer ones oblong or oval, the inner ones with scarious tips. Ligule of the ray-florets very small. Setæ of the outer pappus plumose towards the apex.—*Longchampia capillifolia,* Willd. in Ges. Nat. Freunde Mag. v. p. 160 (Berol., 1811); *Leyssera capillifolia,* DC. Prodr. vi. p. 279 cum syn.

Nile Land. Soturba, *Schweinfurth!*
Occurs also from Spain through North Africa to Western Asia.

40. **ATHRIXIA,** Ker.; Benth. et Hook. f. Gen. Pl. ii. 328.

Capitula heterogamous radiate, ray-florets ligulate (in the following sp.). Involucre turbinate-campanulate, many-flowered; bracts multiseriate pointed narrow with squarrose tips, outer successively shorter. Receptacle naked. Anther-base sagittate with tailed auricles. Achenes oblong costate. Pappus 1-seriate or with very short outer setulæ.—Shrubby (or herbaceous) with alternate entire narrow revolute leaves and terminal solitary or subcorymbose pink (or yellow) capitula.

Chiefly South African and Australian.

1. **A. rosmarinifolia,** *O. & H.* Fruticose, 2 ft. high or more; branches virgate, erect or ascending, slender, leafy above, terete, somewhat striate, whitish tomentose or puberulous at the extremities, puberulous or thinly lanate below, ultimately glabrate. Leaves linear or narrowly linear-lanceolate, acute or apiculate, sessile, not narrowed at base, albido-tomentose beneath, nearly or quite glabrous and shining above, coriaceous, margins entire revolute; $\frac{1}{2}$–$3\frac{1}{4}$ in. long by $\frac{1}{30}$–$\frac{2}{5}$ in. wide; uppermost smaller. Capitula $\frac{1}{3}$ in. long, on very short peduncles, solitary or 1–3 close together, terminal and subterminal. Scales of the involucre acute, apiculate, more or less woolly at the back at least above, reflexed at apex; inner linear, ciliate, scarcely

exceeding the fl., outer successively shorter and more lanceolate and woolly. Receptacle areolate, narrow. Fl. pink. Achenes thinly and shortly pubescent when young, at length glabrate except at base where is a ring of erect hairs, 6–8-costate. Pappus biseriate; outer very short.—*Klenzea rosmarinifolia*, Schultz Bip. in Hb. Schimp. Abyss. sec. i. n. 265, and in Walp. Repert. ii. p. 973.

Nile Land. Abyssinia, *Schimper! Roth! Petit!*

Mozamb. Distr. Manganja range, Mount Chiradzura, *Dr. Meller!* 10,000 ft. or little less to summit.

41. **ANTITHRIXIA,** DC.; Benth. et Hook. f. Gen. Pl. ii. p. 329.

Capitula heterogamous radiate; ray-florets ligulate, 1-seriate. Involucre campanulate or turbinate, scales multiseriate, imbricate scarious, outer gradually shorter. Receptacle plane paleaceous. Anther-base sagittate, auricles tailed. Achenes subterete. Pappus copious setose; setæ sub-2-seriate unequal.—Low slender shrubs with alternate (or opposite) narrow entire leaves and solitary terminal yellow capitula.

A small African genus, one species being peculiar to the Cape.

Leaves linear hoary beneath, not overtopping the capitula . 1. *A. abyssinica.*
Leaves acicular or nearly so, overtopping the capitula . . . 2. *A. angustifolia.*

1. **A. abyssinica,** *Benth. et Hook. f. Gen. Pl.* ii. p. 329. Wiry diffuse undershrub, about 1 ft. high; branches terete, hoary and leafy above, glabrate and marked by the crowded scars of fallen leaves below, at length smooth. Leaves linear, acute, apiculate, sessile, not narrowed at the base, closely hoary-tomentose at least beneath, sometimes glabrous above, $\frac{1}{4}$–$\frac{3}{4}$ in. long by $\frac{1}{30}$–$\frac{1}{10}$ in. wide, coriaceous, entire, nearly flat. Capitula turbinate $\frac{1}{3}$–$\frac{1}{2}$ in. long, subsessile, solitary, terminal, not overtopped by the upper leaves. Scales of the involucre obtuse or subacute, glabrous or nearly so, straight, straw-coloured; inner linear, caducous; outer successively shorter and more lanceolate-oblong. Receptacle somewhat elevated, flat, naked. Achenes glabrous (?) (terete, elongate, albido-sericeous, according to Rich. Fl. Abyss. i. 398).—*Klenzea abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. sec. i. n. 227, and in Walp. Repert. ii. p. 973.

Nile Land. Abyssinia, *Schimper! Pullen!* alt. 8000 ft.

2. **A. angustifolia,** *O. & H.* Suffruticose, more than 1 ft. high; branches terete, leafy and faintly puberulous towards the extremities, early glabrescent and marked by the crowded scars of the fallen leaves. Leaves acicular or narrowly linear, patent or erect-patent, firmly pointed, sessile, not narrowed at the base, glabrous, entire, coriaceous, nearly flat, $\frac{1}{2}$–$1\frac{1}{8}$ in. long by $\frac{1}{40}$ in. wide. Capitula $\frac{2}{3}$–$\frac{1}{2}$ in. long, campanulate, somewhat turbinate, many-flowered, subsessile, terminal at ends of numerous branches, solitary, overtopped by upper leaves. Scales of the involucre glabrous; innermost linear, subacute; outer obtuse, mucronulate, successively shorter and more oblong and outermost more lanceolate. Receptacle shortly alveolate, very shortly dentate. Achenes thinly

and shortly pubescent.—*A. abyssinica*, Vatke in Linnæa xxxix. p. 493, non Benth. et Hook. f.

Nile Land. Abyssinia, *Schimper!*

42. **INULA**, L.; Benth. et Hook. f. Gen. Pl. ii. 330.

Capitula heterogamous usually yellow and radiate; florets of ray ♀, 1-multiseriate. Involucral bracts multiseriate, imbricate; receptacle plane or slightly convex, areolate or foveolate. Corolla of female fl. 2–3-dentate, sometimes minute; of hermaphrodite fl. tubular 5-toothed. Anther-base sagittate with long tails. Achenes subterete, 4–6-ribbed or with the intermediate ribs equally distinct. Pappus 1-pluriseriate, setæ few or copious, unequal.—Herbaceous or frutescent with alternate, simple, entire or serrate, more or less scabrid pubescent or tomentose leaves. Capitula usually in terminal corymbose cymes; occasionally on short lateral branches.

A large genus especially of temperate countries of the Old World. The following species are confined to Africa.

Shrubby. Outer florets ligulate, female.
- Capitula solitary. Leaves dilated subauriculate at the base — 1. *I. somalensis.*
- Capitula densely corymbose. Leaves all narrowed and shortly petiolate at the base.
  - Scales of the involucre of nearly equal length, densely shaggy . . . . . 2. *I. Arbuscula.*
  - Scales of the involucre very unequal, somewhat hairy . 3. *I. confertiflora.*

Herbaceous. Florets all hermaphrodite, tubular.
- Capitula corymbose.
  - Scales of the involucre more or less acute . . . . . 4. *I. macrophylla.*
  - Scales of the involucre more or less obtuse . . . . . 5. *I. Mannii.*
- Capitula in interrupted subglobose clusters . . . . . 6. *I. glomerata.*

1. **I. somalensis,** *Vatke in Oesterr. Bot. Zeitschr.* 1875, p. 326. A small shrub, about 8 in. high, with the habit of a *Pulicaria*. Stem erect, branched; branches woody, angular, pubescent above. Leaves alternate, obovate-oblong, denticulate, punctate beneath, about 2 by $\frac{2}{5}$ in.; base dilated, subauriculate, subsemiamplexicaul; teeth and apex mucronate; margin and midrib below pubescent-shaggy. Capitula solitary, radiate, shortly pedunculate. Involucral bracts obovate-lanceolate, loosely imbricate, mucronulate, nearly equal; the accessory ones few. Receptacle areolate. Achenes terete, appressedly setose from the base to the apex. Setæ of the pappus 15, barbellate.

Nile Land. Somali country, among the Ahl Mountains, *Hildebrandt.*
The description is taken from Vatke l.c.

2. **I. Arbuscula,** *Delile in Ann. Sc. Nat.* ser. ii. vol. xx. p. 93. Shrubby; branches terete, striate and puberulous below, villous leafy and tawny above. Leaves ovate or lanceolate, acute or subacute, mucronulate, narrowed at the base into short petiole, denticulate, pale-tomentose beneath less so above, 3–6 in. long by 1–2 in. wide, uppermost smaller. Capitula hemispherical, many-flowered, 1 in. diameter, on unequal villous pedicels $\frac{1}{4}$–$\frac{2}{3}$ in. long, in dense corymbose terminal

cymes 3–6 in. diameter. Scales of the involucre multiseriate, imbricate, of nearly equal length, acute, ciliate; inner linear, shortly hairy; outer successively wider, more lanceolate and villous; outermost foliaceous, densely villous. Receptacle flat, naked, $\frac{1}{4}$ in. or more in diameter. Outer fl. ligulate. Achenes oblong, $\frac{1}{15}$ in. long, costate, with erect-patent short setæ near top. Pappus tawny, uniseriate, barbellate. —Del. in Ferr. et Galin. Voy. Abyss. iii. p. 147, t. xiv.; *I. fruticosa*, Schultz Bip. in Hb. Schimp. Abyss. sec. ii. n. 664.

Nile Land. Abyssinia, *Ferret and Galinier, Schimper!*

3. **I. confertiflora,** *A. Rich. Fl. Abyss.* i. p. 399. Shrubby below, much branched above; branches terete, striate, albido-tomentellous and leafy at extremities. Leaves elongate-lanceolate, acute, narrowed at the base, shortly petioled, denticulate, albido-tomentellous beneath, nearly glabrous above, reticulate, submembranous, $1\frac{1}{2}$–5 in. long by $\frac{1}{3}$–$1\frac{1}{3}$ in. wide; denticulation gland-tipped. Capitula subhemispherical, $\frac{1}{2}$–$\frac{2}{3}$ in. diameter, many-flowered, on unequal bracteate pedicels ranging up to 1 in. long, in dense corymbose or rounded terminal cymes 3–7 in. wide; bracts foliaceous. Scales of the involucre multiseriate, unequal, imbricate, ciliate; inner linear acute; outer successively shorter, more obtuse lanceolate and hairy at the back. Receptacle flat, naked, $\frac{1}{8}$ in. diameter. Outer fl. ligulate. Achenes oblong, terete, about 10-costate, $\frac{1}{15}$ in. long, with few short erect-patent setæ near apex. Pappus uniseriate, pale-fulvous, minutely scabrid.

Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit! Roth!*

4. **I. macrophylla,** *Schultz Bip. in Schweinf. et Aschers. Enum.* pp. 285, 307, *non Hort.* (*Steud.*) Robust erect perennial herb, $2\frac{1}{2}$–5 ft. high; stem branched only above, somewhat sulcate and angular, more or less pubescent. Leaves oval or ovate, obtuse or uppermost subacute, submembranous, tawny-tomentose at least beneath, asperulous above, denticulate; upper cordate-auricled, amplexicaul, sessile; lower and radical narrowed at base and petioled, 1 ft. or more long. Capitula campanulate, somewhat turbinate, $\frac{1}{3}$ in. long, about 30-flowered, on short unequal pedicels, in a dense branched corymbose terminal cyme 4–8 in. wide. Scales of the involucre multiseriate, unequal, imbricate, acute or subacute, tawny; innermost somewhat caducous, linear, ciliate above, outer successively shorter, more lanceolate and more hairy at the back. Receptacle foveolate, naked, $\frac{1}{10}$ in. diameter. Florets all hermaphrodite, yellow. Achenes terete, oblong, about 12-ribbed, with few minute setæ on some of the ribs above, $\frac{1}{12}$ in. long. Pappus uniseriate, fulvous, scabrid.—*Inulaster macrophyllus*, Schultz Bip. in Hb. Schimp. Abyss. sec. ii. nn. 912, 938; A. Rich. Fl. Abyss. i. p. 599.

Abyssinian name *Ternacha.*

Nile Land. Abyssinia, *Schimper! Petit!*

5. **I. Mannii,** *Benth. et Hook. f. Gen. Pl.* ii. p. 331. Erect robust herb, 2–10 ft. high; stem and branches angular, sulcate, pubes-

cent above, hairs arising from a glandular base. Radical leaves 2–3 ft. long by 7–8 in. wide, membranous, narrowly elliptical, narrowed towards the acute apex, attenuate at base into a short petiole, denticulate, few scattered appressed hairs on both sides. Stem-leaves lanceolate narrowed towards the obtuse mucronulate apex, cordate-auriculate, sessile, amplexicaul, membranous, denticulate, whitish-woolly beneath, nearly glabrate and asperulous above, increasing downwards to 6–10 in. long by $1\frac{1}{2}$–$5\frac{1}{2}$ in. wide or more. Capitula campanulate, $\frac{1}{2}$ in. long, 30–40-flowered, on short unequal pedicels, in dense corymbose cymes at ends of branches. Scales of the involucre pluriseriate, imbricate, unequal, puberulous or pubescent outside, ciliate, obtuse or subacute; innermost linear; outer successively shorter and more lanceolate. Receptacle areolate, ultimately smooth, flat. $\frac{1}{8}$ in. diam. Achenes glabrous, obscurely 8-ribbed. Florets all hermaphrodite. Setæ of the pappus about 25 somewhat unequal, 1–2-seriate. — *Vernonia* (*?*) *Mannii*, Hook. fil. in Journ. Linn. Soc. vii. p. 198; *Laggera heteromalla*, Vatke in Linnæa xxxix. p. 487.

Upper Guinea. Cameroon Mountains, 7000 ft. alt., *Mann!*
Nile Land. Abyssinia, *Schimper!* a. 1863, n. 1528.

6. **I. glomerata,** *O. & H.* Robust herb, 4 ft. high; branches fulvo-puberulous, somewhat angular. Leaves oval or ovate, denticulate; upper ovate, obtuse or subacute, subauriculate, sessile, amplexicaul, tomentose; the radical ones obtuse, narrowed at base into petiole, membranous, asperulous above, tomentose beneath, $1\frac{1}{2}$ ft. long by 8 in. wide; petioles 9 in. long. Capitula pyramidal, $\frac{1}{3}$–$\frac{1}{2}$ in. long, many-flowered, sessile, collected in dense subglobose clusters 1–2 in. diam. with leafy bracts at base, terminal and in interrupted heads at ends of short axillary branches. Scales of the involucre pluriseriate, unequal, imbricate; inner linear, acute, ciliate, somewhat caducous; outer successively shorter more obtuse oblong and hairy at the back. Receptacle subfoveolate naked. Florets all hermaphrodite. Achenes oblong, 5–6-costate, $\frac{1}{16}$ in. long, with few minute setæ near top. Pappus uniseriate, tawny, minutely scabrid.

Mozamb. Distr. Manganja hills, Soche, 3000 ft. alt., *Dr. Kirk!*
A solitary radical leaf from Matebele country collected by *T. Baines!* resembles those of this species.

43. IPHIONA, Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 333.

Capitula homogamous, discoid, the florets usually all tubular and hermaphrodite. Involucre campanulate or ovoid, bracts multiseriate, imbricate, dry more or less scarious; receptacle narrow naked. Anther-base sagittate with slender tails. Achenes subterete (hirsute in the following) 8–10-costate. Pappus 1–∞-seriate, setæ copious.—Branching more or less glabrous or scabrid shrubs, with alternate entire or toothed leaves and yellowish white capitula, either solitary or cymose.

A small genus, chiefly Mediterranean and Mascarene.

Leaves subulate-pungent. Pappus multiseriate . . . . 1. *I. scabra.*
Leaves obovate. Pappus uniseriate . . . . . 2. *I. rotundifolia.*
Leaves oval-oblong, minute . . . . . 3. *I? microphylla,*

1. **I. scabra,** *DC. Prodr.* vi. p. 475. Shrubby, scattered with short glandular scabrous pubescence; branches ascending, numerous. Leaves subulate-pungent, sessile, $\frac{1}{2}$–1 in. long, with 1–3 spines about $\frac{1}{8}$ in. long at the base on each side. Capitula campanulate, $\frac{1}{2}$ in. long, about 14-flowered, solitary, axillary and terminal, often crowded, on pedicels ranging up to 1 in. long. Scales of the involucre 3–4-seriate, puberulous; inner linear, acute; outer shorter less acute or subobtuse; outermost acute. Receptacle $\frac{1}{15}$ in. wide, naked. Achenes oblong, $\frac{1}{10}$ in. long, hirsute. Pappus tawny, multiseriate, unequal, subscabrid.

Nile Land. Soturba, *Schweinfurth!* Shores of Red Sea, *Nimmo!*
Occurs also in Egypt, Arabia, etc.

2. **I. rotundifolia,** *O. & H.* Shrubby; branches pale terete glabrous. Leaves obovate, rounded at apex, narrowed at the base, subsessile, shortly petiolate, glabrous, firm, $\frac{1}{4}$–$\frac{2}{3}$ in. long by $\frac{1}{5}$–$\frac{1}{2}$ in. wide; margins with deltoid apiculate teeth. Capitula campanulate or campanulate-oblong, $\frac{1}{4}$–$\frac{3}{8}$ in. long, on unequal pedicels $\frac{1}{8}$–$\frac{1}{2}$ in. long, in moderately dense terminal corymbose cymes $\frac{3}{4}$–$1\frac{3}{4}$ in. diam. Scales of the involucre multiseriate, very unequal, nearly glabrous, obtuse, mucronulate, pale straw-coloured with dark (purple?) midrib; inner oblong; outer successively shorter and more elliptical or rotund. Receptacle narrow. Achenes densely hirsute. Pappus uniseriate, pale tawny, minutely barbate.

Nile Land. Somali country, *Capt. Playfair!*
Yields the Gagaboot (Dagaboot of Vaughan); see also note under *Pluchea pinnatifida.*

3. **I.? microphylla,** *Vatke in Oesterr. Bot. Zeitschr.* xxvii. p. 196 (1877). Scabrous, shortly villous, divaricately much branched, bushy; branches loosely few-headed. Leaves oval-oblong, sparse, strigose on both sides, minute, $\frac{1}{25}$–$\frac{1}{4}$ in. long, ranging up to $\frac{1}{12}$ in. in width. Capitula terminal, $\frac{2}{5}$ in. diameter; peduncles of moderate length ($\frac{3}{5}$ in.), bracteolate. Involucral scales appressedly imbricated, rather obtuse, keeled, pencilled-cottony on the margin and at the apex. Setæ of the pappus 4 times the length of the villous achene.

Nile Land. Somali-land, among the mountains of Serrut, near Meid, 6000 ft., alt., April, *Hildebrandt.*
The description is taken from Vatke, l.c.; we have seen no specimen.

44. PEGOLETTIA, Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 334.

Capitula homogamous, discoid, campanulate, florets all tubular fertile. Involucral scales pauciseriate narrow acute; receptacle naked. Anther-base sagittate with long tails. Achenes elongate subterete, 10-12-costate. Pappus duplex; inner of long copious plumose setæ, outer shorter paleaceous, paleæ multifid or toothed.—Pubescent freely branching herbs with alternate narrow leaves and terminal solitary or loosely panicled capitula.

A small genus of Tropical and Southern Africa.

Achenes $\frac{1}{6}$ in. long, scattered with rather rigid hairs . . 1. *P. senegalensis.*
Achenes $\frac{1}{12}$–$\frac{1}{7}$ in. long, pubescent . . . . . 2. *P. mucronata.*

1. **P. senegalensis,** *Cass.; DC. Prodr.* v. p. 481. Annual, paniculately branched, scaberulous, with short crisp hispid hairs, subglutinous above, $\frac{1}{3}$–2 ft. high; branches subterete, striate. Leaves linear or oblanceolate, deltoid or subacute at apex, usually apiculate, gradually narrowed towards the base, sessile, entire or with a few irregular remote teeth above, $\frac{1}{2}$–$1\frac{1}{3}$ in. long by $\frac{1}{16}$–$\frac{5}{16}$ in. wide; uppermost smaller, bract-like, subulate. Capitula campanulate, 18–30-flowered, $\frac{1}{3}$–$\frac{1}{2}$ in. long, solitary at the ends of the numerous pedunculiform branches. Scales of the involucre pauciseriate, acute, falling short of the florets; inner linear-lanceolate, with scarious margins; outer shorter, linear-subulate, often recurving. Receptacle alveolate; margins of alveoli toothed. Florets at first yellow, at length purple. Achenes oblong, $\frac{1}{6}$ in. long, 10–12-costate, with scattered rather rigid hairs. Pappus biseriate, subfulvous; inner subplumose; outer $\frac{1}{3}$ as long, subpaleaceous, multifid.—Jaub. et Spach, Illustr. Pl. Orient. iv. p. 63, t. 341; *Kuhnia arabica*, Hochst et Steud. in Hb. Schimp. Arab. Fel. n. 863 !; DC. Prodr. vii. 267.

Upper Guinea. Senegambia, *Roger! Perrottet. Brunner!*
North Central. Kouka, *E. Vogel!*
Nile Land. Nubia, *Kotschy!* ? Abyssinia, *Roth.*
Occurs also in Tropical Arabia, Cape Verde Islands, Scinde, etc.

2. **P. mucronata,** *Benth. in Hook. Niger Fl.* p. 432. Herbaceous, $1\frac{1}{2}$ ft. high or more, paniculately branched; upper parts scaberulous with short crisp hispid hairs, subglutinous; branches terete, striate, ascending. Leaves linear or linear-oblanceolate, usually obtuse, mucronate, gradually narrowed towards the base, sessile, entire or with 1–2 irregular remote teeth above; upper $\frac{1}{3}$–$\frac{1}{2}$ in. long by $\frac{1}{16}$–$\frac{1}{8}$ in. wide; uppermost smaller, filiform, subulate, bract-like. Capitula widely campanulate, $\frac{1}{3}$–$\frac{2}{3}$ in. long, solitary at the ends of the pedunculiform branches. Scales of the involucre pauciseriate, acute, falling short of the florets; inner linear-lanceolate; outer shorter, linear- or filiform-subulate; outermost recurving. Receptacle foveolate. Achenes oblong, $\frac{1}{12}$–$\frac{1}{7}$ in. long, about 10-costate, pubescent. Pappus biseriate; inner subplumose, of the outer achenes turning greenish in drying; outer pappus shorter, setaceo-multifid, subfulvous.

Lower Guinea. Elephant Bay, Benguela, *Curror!*
Scarcely a different species from the former.

45. **VICOA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 334.

Capitula hemispherical, heterogamous, radiate, many-flowered, ray-florets narrow ligulate ♀, sometimes wanting. Involucral bracts pluriseriate, narrow, imbricate more or less, scarious, finely pointed. Receptacle naked. Corolla of hermaphrodite florets tubular 5-toothed. Anther-base sagittate with fine tails. Achenes oblong or ellipsoidal, pubescent or glabrous, not or scarcely costate. Pappus 1-seriate, setæ few or indefinite.—Herbs with alternate entire or toothed leaves, and yellow pedunculate solitary or cymosely panicled capitula.

A small genus of the Old World Tropics.

Leaves sessile, amplexicaul, lanceolate or oblong . . . 1. *V. auriculata.*
Leaves petiolate, oval or ovate, strongly toothed . . . 2. *V. divaricata.*

1. **V. auriculata,** *Cass.; DC. Prodr.* v. p. 474. Erect annual, 1–3 ft. high, simple below, somewhat loosely branched above; branches terete striate, puberulous at least above. Leaves alternate or occasionally subopposite, linear lanceolate or oblong, acute or subobtuse, sessile, auriculate at the base, amplexicaul, puberulous or nearly glabrous, $\frac{1}{2}$–3 in. long by $\frac{1}{12}$–$\frac{3}{4}$ in. wide, membranous, denticulate or subentire. Capitula hemispherical, many-flowered, about $\frac{1}{3}$–$\frac{1}{2}$ in. diam., solitary on slender pedicels $\frac{1}{8}$–$1\frac{1}{2}$ in. long, in a somewhat loose terminal panicle. Scales of the involucre pluriseriate, acute, scattered with small sessile glands; inner linear, straight; outer subulate, recurving. Receptacle flat naked $\frac{1}{8}$–$\frac{1}{5}$ in. diam. Florets all tubular, orange-yellow. Achenes ellipsoidal-oblong, $\frac{1}{30}$ in. long, pale, pubescent.—*V. indica,* DC.; Prodr. v. p. 474; *Inulaster Kotschyi,* Schultz Bip. in Hb. Kotschy Nubic. n. 108; *Varthemia Kotschyi,* Schultz Bip. in Hb. Schimp. Abyss. sect. ii. sub. n. 938; *Conyza Kotschyi,* Schultz Bip. ex Schweinf. et Aschers Fl. Æthiop. p. 307; *Inula leptoclada,* Webb, Spicil. Gorgon. 137, ex Schweinf. et Aschers, *l. c.*

Upper Guinea. Senegambia, *Capt. Boteler!;* Niger Expedition, *Barter!*
Nile Land. Cordofan and Sennaar, *Kotschy!* Bongo-land, *Schweinfurth!* Djur, Upper Nubia, *Tinné;* Soturba, *Schweinfurth!*
Occurs also in Egypt, Cape Verde Islands, and India.

2. **V. divaricata,** *O. & H.* Herbaceous, divaricately branched; branches slender, terete, puberulous. Leaves alternate, oval or ovate, apiculate, narrowed at the base, petioled, with large apiculate teeth, puberulous at least below, $\frac{1}{4}$–$\frac{3}{4}$ in. long by $\frac{1}{10}$–$\frac{1}{2}$ in. wide. Petioles narrowly alate, ranging up to $\frac{1}{3}$ in. long. Capitula subhemispherical, many-flowered $\frac{3}{8}$ in. diam., solitary on long slender axillary and terminal peduncles $\frac{2}{3}$–4 in. long, loosely panicled. Scales of the involucre pauciseriate, linear, acuminate, puberulous; outer shorter. Receptacle punctate, plano-convex, $\frac{1}{8}$ in. diam.; outer florets ♀, ligulate. Achenes oblong, not contracted at the top, $\frac{1}{30}$ in. long, pubescent when young, at length nearly glabrous. Pappus uniseriate, of few scabrid setæ.

Nile Land. Abyssinia, *Ehrenberg!*

46. **CALOSTEPHANE,** Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 335.

Capitula heterogamous, yellow, radiate, ray-florets 1-seriate ♀. Involucre somewhat hemispherical of 1–2-seriate narrow unequal bracts not exceeding the florets. Receptacle foveolate. Corolla of ray with elliptical or oblong minutely 3-dentate limb; of disk tubular with 5-fid recurved limb. Anther-base finely sagittate, tails capillary. Achenes prominently 10-costate, ribs setulose. Pappus of 5 obovate denticulate hyaline paleæ alternate with as many narrow and slightly longer.—Puberulous or scabrid erect forking slender herb. Leaves

alternate petiolate nearly entire. Capitula loosely cymose-panicled pedunculate.

A monotypic genus.

1. **C. divaricata,** *Benth. in Hook. Ic. Pl.* 1111. Divaricately branched herb, 2 ft. or more high; branches slightly striate, alate above, puberulous or above scaberulous. Leaves ovate or lanceolate, subobtuse, cuneate at the base into alate petiole, glandular-punctate, membranous, denticulate or subentire, $\frac{1}{2}$–2 in. long by $\frac{1}{8}$–$\frac{1}{2}$ in. wide; midrib asperulous with short hooked bristles; petioles shorter than the leaves, dilated below and decurrent, asperulous at the alate margins. Capitula depressed-globose, $\frac{1}{2}$ in. wide by $\frac{1}{3}$ in. high, on distinct unequal terminal and subterminal peduncles. Scales of the involucre linear-subulate, uniseriate, not wholly contiguous, acute, with hooked bristles outside. Receptacle $\frac{1}{8}$ in. diam. Achenes costate somewhat falcate; ribs setulose.

Mozamb. Distr. Kaimba Island, opposite Tette, *Dr. Kirk!*

47. PULICARIA, Gaert.; Benth. et Hook. f. Gen. Pl. ii. p. 335.

Capitula heterogamous, radiate or discoid, outer florets ♀. Involucre hemispherical; bracts narrow acute pauciseriate, outer more or less herbaceous usually shorter. Receptacle foveolate or punctate. Ray-florets ligulate or limb of corolla minute. Anther-base sagittate finely tailed. Achenes subterete or ribbed. Pappus more or less distinctly duplex, outer usually minute cupuliform dentate, inner setaceous.—Herbs usually hairy or puberulous with alternate sessile often amplexicaul entire or toothed leaves and solitary or cymosely panicled yellow capitula.

A considerable Old World genus of the Tropics and Northern temperate zone.

Pappus biseriate; outer pappus cup-shaped, toothed; inner pappus composed of scabrid setæ.
- Leaves petiolate . . . . . 1. *P. petiolaris.*
- Leaves sessile or the lowermost ones petiolate.
  - Setæ of the inner pappus 7–8.
    - Outer involucral bracts herbaceous. Setæ of the pappus barbellate towards the tip . . . . 2. *P. Rüppellii.*
    - Outer involucral bracts dark brown at the apex. Setæ of the pappus plumose-barbellate at the apex . . . . . 3. *P. Kurtziana.*
  - Setæ of the inner pappus 10–15. Receptacle punctate or areolate.
    - Leaves narrowed, not amplexicaul at the base . . 4. *P. Grantii.*
    - Leaves auriculate-amplexicaul.
      - Leaves mucronate, denticulate, flat . . . . . 5. *P. vulgaris.*
      - Leaves obtuse, not mucronate, dentate, often undulated . . . . . 6. *P. undulata.*
  - Setæ of the inner pappus 20. Receptacle alveolate . 7. *P. Hildebrandtii.*

Pappus biseriate; outer pappus of short setæ; inner of longer setæ . . . . . 8. *P. Renschiana.*

Pappus subuniseriate, of setæ with a few short ones . . 9. *P. crispa.*

1. **P. petiolaris,** *Jaub. et Spach, Illustr. Pl. Orient.* iv. p. 69, t. 344. Suffruticose, 1–1½ ft. high; upper parts herbaceous glandular-puberulous and shortly and appressedly pubescent; branches irregularly divaricate, terete and leafless below, striate-angular and leafy above. Leaves alternate, oval or lanceolate, acute or subacute, cuneate or truncate at base into narrowly winged petiole, membranous, dentate, flat, ½–2 in. long by ¼–⅘ in. wide; uppermost smaller; petioles more or less dilated at base, amplexicaul ⅕–1 in. long, uppermost shorter. Capitula subhemispherical, many-flowered, ⅜–⅝ in. diameter, solitary on pedicels ¼–4 in. long, loosely corymbose, radiate. Scales of the involucre pauciseriate, unequal, imbricate, thinly glandular-pubescent, linear-acute or -subulate; outer successively shorter. Receptacle punctate flat, 1½ in. diameter. Achenes subfusiform, contracted at the apex below the pappus, thinly pubescent. Outer pappus short, connate at the base; inner of about 4 deciduous setæ, barbellate above.—*Kiliana chrysopsioides*, Schultz Bip. in Flora xxiv. i. Intell. Bl. p. 26 (1841); *P. chrysopsioides*, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 286; *Allagopappus chrysopsioides*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. 153.

Nile Land. Abyssinia, *Salt! Schimper!* 3500–9000 ft. alt.; Nubia and Sennaar (Schweinf. et Aschers. Enum. p. 286).

A specimen from Somali-land, *Hildebrandt!* seems to belong to this species.

2. **P. Rüppellii,** *Schultz Bip. in Hb. Schimp. Abyss.* sect. ii. n. 1041. Erect annual 2½–9 in. high, more or less albido-lanate; branches few terete. Leaves obovate-spathulate, obtuse, sessile, auricled and amplexicaul or lower narrowed at the base into a short alate petiole, denticulate, flat, more or less arachnoid-tomentose, especially beneath, ½–2½ in. long by 1½–⅘ in. wide. Capitula hemispherical, many-flowered, ⅓–¾ in. diameter, solitary on terminal and subterminal peduncles ½–2 in. long, radiate. Scales of the involucre pauciseriate, more or less densely woolly; inner linear, acute, with a long tail-like apiculus; outer linear-oval, acute or obtuse, apiculate, scarcely or not shorter, herbaceous. Receptacle 1/16 in. diameter, flat, naked. Ligule long, tridentate. Achenes terete, slightly sericeous or glabrate; outer pappus cup-shaped, dentate; inner of about 7 white setæ barbellate towards the tip.—A. Rich. Fl. Abyss. i. p. 401; *P. involucrata*, R. Br. in Salt Voy. Abyss. App. p. lxv. (name only) (1814).

Nile Land. Abyssinia, *Salt! Schimper! Ehrenberg!* shores of Red Sea, between 11° and 12° N. Lat., *Lord!*

3. **P. Kurtziana,** *Vatke in Oesterr. Bot. Zeitschr.* 1875, p. 327. A small shrub, 1½ ft. high, densely glandular and slightly pilose on the herbaceous parts. Leaves oblong-linear, coarsely pinnatifid-dentate towards the apex, somewhat fleshy ?, callous-mucronate, 1½ by 1/15 in. Peduncles 1-headed. Capitula many-flowered, radiate. Involucre broadly campanulate; bracts numerous, ovate-lanceolate, unequal, the outer ones gradually smaller, dark brown at the apex, rather acute, nearly glabrous, keeled. Ray-florets scarcely one-third longer than

the disk; ligule obovate-oblong, 3-dentate, yellow. Anthers linear with torn tails. Stigma exserted, straight, linear-filiform, papillose. Achenes oblong, 8-costulate, glabrous. Outer pappus campanulate, slightly incise-denticulate, with rather acute lobes; setæ of the inner pappus 8, spathulate, rather broad, serrulate on the margin, plumose-barbellate at the apex, about as long as the corolla of the female florets.

Nile Land. Somali country, among the Ahl Mountains, at 3,300 ft. of altitude, *Hildebrandt!*

The description is taken from Vatke, l.c.

4. **P. Grantii,** *O. & H.*; *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 96, t. 64, fig. A. Erect shrub, 2 ft. high or more; branches subvirgate, terete, striate, glandular-puberulous, glabrescent. Leaves linear subacute, somewhat narrowed downwards, sessile, not amplexicaul, apiculate, pubescent-tomentose ranging up to 1 in. long by $\frac{1}{10}$ in. wide or more. Capitula hemispherical, many-flowered, about $\frac{1}{2}$ in. diameter, solitary, radiate, on peduncles $1\frac{1}{2}$–2 in. long, terminal and subterminal. Scales of the involucre pauciseriate, linear or linear-subulate, hispid with short curved hairs; inner acuminate; outer shorter. Receptacle flat, punctate, $\frac{1}{8}$ in. diameter. Disk-fl. 5-dentate. Achenes obovate-oblong, hirsute. Outer pappus cup-shaped, dentate; inner of about 12–15 barbellate setæ, rather thicker upwards.—*Varthemia arabica*, T. Thoms. in Speke, Journ., App. p. 638, non Boiss.

Nile Land. Nile, 16° N. Lat., *Speke and Grant!*

5. **P. vulgaris,** *Gaertn.*; *DC. Prodr.* v. p. 478. Herbaceous, erect, much branched at least above, more than 1 ft. high, puberulous; branches subterete, striate. Leaves linear-oblong, subobtuse or subacute, mucronate, sessile, cordate semiamplexicaul, entire or obsoletely denticulate, $\frac{1}{2}$–$2\frac{1}{2}$ in. long by $\frac{1}{6}$–$\frac{1}{2}$ in. wide. Capitula hemispherical, many-flowered, $\frac{5}{12}$–$\frac{1}{2}$ in. diameter, solitary or subsolitary, on pedicels $\frac{1}{3}$–2 in. long, terminal and subterminal, radiate. Scales of the involucre pauciseriate, glandular-pubescent, linear acute apiculate; outer rather shorter. Receptacle plane-convex, areolate, naked, $\frac{1}{5}$–$\frac{1}{4}$ in. diameter. Ligule of ray tridentate, $\frac{1}{30}$–$\frac{1}{15}$ in. broad. Achenes oblong, setulose. Outer pappus cup-shaped, dentate, inner of about 10–12 setæ, barbellate towards the tip.—*P. arabica*, Cass.; DC. l.c.

Nile Land. Abyssinia, *Ant. Petit!*

Widely dispersed in Europe, Asia, Egypt, &c.

6. **P. undulata,** *DC. Prodr.* v. p. 479. Erect much branched annual or biennial $\frac{1}{2}$–2 ft. high, more or less hoary-lanuginous or occasionally pubescent; branches terete striate. Leaves oblanceolate or oblong or uppermost linear, obtuse or uppermost subacute, dentate, often undulate, auriculate-amplexicaul, $\frac{1}{2}$–2 in. long by $\frac{1}{8}$–$\frac{2}{3}$ in. wide. Capitula subhemispherical, $\frac{1}{3}$–$\frac{2}{3}$ in. diameter, many-flowered, solitary, terminal and subterminal, radiate, on peduncles $\frac{1}{4}$–$1\frac{1}{2}$ in. long. Scales of the involucre sub-4-seriate, glandular-puberulous, linear, acute, subappressed; outer shorter, sometimes spathulate and subobtuse. Receptacle areolate, $\frac{1}{6}$–$\frac{1}{3}$ in. diameter. Achenes obovoid-oblong, setulose,

terete, obscurely ribbed. Pappus biseriate; outer cup-shaped, dentate; inner of about 14–15 scabrid setæ, rather dilated and notched at the tip.—*P. incisa*, DC. l.c.; *P. orientalis*, Jaub. et Spach Illustr. Pl. Orient. iv. p. 65, t. 342 (form with outer involucral scales somewhat spathulate subobtuse); *P. aromatica*, Br. ! in Salt Abyss. App. p. lxv. (name only).

Upper Guinea. Senegambia, *Perrottet, Rousillon.*

Nile Land. Nubia, *Bromfield! Kotschy!* Abyssinia, *Schimper! Salt! Hildebrandt.* Sennaar, *Kotschy!* Cordofan (Schweinf. et Aschers. Enum. p. 286).

North Central. Middle Soudan, *Beurmann*, fide Schweinf. Ber. Beurm. Pfl. in Zeitschr. Allg. Erdk. xv. p. 300 (1863).

Occurs also in Palestine, Egypt, Arabia, &c.

Boissier, Fl. Orient. iii. p. 203, also gives Senegal for the distribution of this species.

7. **P. Hildebrandtii,** *Vatke in Oesterr. Bot. Zeitschr.* 1875, p. 326. An undershrub, 1½ ft. high, very like in habit *P. grandidentata*, Jaub. et Spach, pubescent-pilose on the herbaceous parts. Leaves broadly obovate, obtuse, dilated at the base, amplexicaul, beyond the middle coarsely and unequally incise-dentate from the apex, strong-scented, about 2½ by 1¼ in.; teeth and apex mucronate; peduncles terminal, 1-headed, short, nearly naked. Capitula subhemispherical, radiate. Outer involucral bracts lanceolate herbaceous, the inner ones linear-lanceolate scarious loosely imbricate. Receptacle alveolate. Achenes (perhaps monstrous?) terete 10-ribbed, twice articulate. Outer pappus with short somewhat torn teeth; inner of 20 barbellate setæ.

Nile Land. Somali country, on the littoral flat and promontories of the Ahl Mountains, at 3300 ft. of altitude, *Hildebrandt!*

The description is taken from Vatke, l.c.

8. **P. Renschiana,** *Vatke in Oesterr. Bot. Zeitschr.* xxvii. p. 197 (1877). Shortly glandular-pubescent, shrubby below; branches rigid-wiry, terete. Leaves narrowly elliptical or rhomboid-lanceolate, acutely narrowed at both ends, serrate-dentate, ranging up to 1½ by ⅗ in., the upper ones smaller; leaf-base or short petiole auriculate-amplexicaul. Peduncles terminal, 1-headed, 2–3 in. long, bearing one or more subulate bracts. Capitula hemispherical, ½–⅔ in. diameter, radiate, many-flowered. Involucral scales pluriseriate, narrowly linear-lanceolate, subulate towards the tip, pubescent towards the base, the outer ones shorter and more subulate. Ligules linear, 1–2-seriate, toothed at the apex, shortly exceeding the involucre, yellow. Achenes setulose.

Nile Land. Somali-land, Serrut Mountains, near Meid, 6,000 ft. alt., fl. April, *Hildebrandt!*

9. **P. crispa,** *Benth. et Hook. f. Gen. Pl.* ii. p. 336. Herbaceous, 1–2½ ft. high, more or less whitish-tomentose or occasionally subglabrous, much branched; branches terete, striate, often obscurely so. Leaves auriculate-amplexicaul, sessile, denticulate-crisped; lower obovate-oblong, narrowed below the middle, rounded or obtuse at the apex, ¾–1½ in. long by ⅛–⅖ in. long; uppermost small linear or lanceolate subacute or subobtuse. Capitula hemispherical, ⅓–⅔ in. diameter,

many-flowered, solitary at the ends of the paniculate branches, radiate. Scales of the involucre pluriseriate, thinly woolly or glandular, linear, acute; outer shorter, recurved at the tips. Disk fl. 4–5-dentate. Receptacle punctate, $\frac{1}{6}$–$\frac{1}{8}$ in. diameter. Achenes glabrous. Pappus sub-1-seriate with a few shorter setæ, subplumosely scabrid above.—*Francoeuria crispa*, Cass.; DC. Prodr. v. p. 475.

Upper Guinea. Senegambia, *Roger!* Dagana, *Leprieur.* Niger, *Barter!*
Nile Land. Cordofan, *Kotschy!* Nubia, *Hartman! Binder;* Nile bank, 16° N. Lat., *Speke and Grant!* Abyssinia, *Roth!*
Also in Cape Verde Islands, Arabia, Egypt, India, &c.

48. **PORPHYROSTEMMA,** Grant; Benth. et Hook. f. Gen. Pl. ii. p. 336.

Capitula heterogamous discoid; outer florets ♀ ∞-seriate narrowly tubular; inner ☿ tubular dilated upwards 5-toothed. Involucre hemispherical of numerous narrow linear or subulate bracts, the outer shorter. Receptacle foveolate hairy. Anther-base sagittate, contiguous auricles connate. Style-branches linear obtuse. Achenes hairy. Pappus of 5 rather long setæ, together with minute uniseriate laciniate scales.—Erect hispid herb with narrow alternate leaves and rather large pedunculate loosely panicled purple heads.

A monotypic endemic genus.

1. **P. Grantii,** *Benth.*; *Oliv. in Linn. Trans.* xxix. p. 96, t. 63. Erect herb, about 2 ft. high; stem corymbosely branched upwards; branches striate, hispid. Leaves linear or narrowly linear-elliptical, obtusely pointed, mucronate, thinly hispid, denticulate, narrowed towards the slightly clasping sessile base, 2–5 in. long by $\frac{1}{4}$–$\frac{4}{5}$ in. wide. Capitula hemispherical, $\frac{3}{4}$ in. diameter, solitary, on distinct peduncles, terminal and subterminal, purple. Scales of the involucre linear-subulate shaggy. Achenes densely hirsute-pilose with ascending hairs.—*Erigeron ??* sp., Thoms. in Speke Journ. App. p. 637.

Nile Land. 4° 15′ S. Lat., near Mininga, in moist places, *Speke and Grant!* salt is extracted from its ashes.

49. **GEIGERIA,** Griessel.; Benth. et Hook. f. Gen. Pl. ii. p. 337.

Heads heterogamous radiate, overtopped by the leaves; ray-florets 1-seriate. Involucre ovoid or campanulate of multiseriate rigid imbricate bracts. Paleæ of receptacle very numerous narrow or setaceous. Ray-florets ligulate, 3-dentate; disk-florets tubular 5-fid. Anther-base sagittate with slender tails. Achenes angled, hairy. Pappus usually of 2-seriate scales, the inner or alternate aristate.—Low herbs, with opposite or alternate glandular or cottony leaves and yellow heads often concealed amongst the leaves.

A genus chiefly confined to the Cape.

Dichotomous alate herb. Leaves oval, glabrate-glandular.
Heads sessile in the forks . . . . . 1. *G. alata.*
Low cottony herb. Leaves narrow. Heads densely tomentose . 2. *G. acaulis.*

1. **G. alata,** *Benth. et Hook. f. Gen. Pl.* ii. p. 337. Glabrous dichotomous annual herb, about $\frac{1}{2}$–1 ft. high; branches widely alate. Leaves opposite, oval-oblong, subacute, mucronate, not much narrowed towards the base, sessile, decurrent, quite entire, membranous, 1–$3\frac{1}{2}$ in. long by $\frac{1}{4}$–1 in. wide, glandular-punctate. Capitula campanulate, $\frac{1}{6}$ in. long, sessile, solitary at the forks of the branches, 10–12-flowered, with small foliaceous bracts at base. Scales of the involucre pauciseriate, oval-oblong, terminated by a subspinous awn, puberulous. Fl. yellow.—*Diplostemma alatum,* DC. Prodr. vii. p. 75.

Nile Land. Cordofan, *Kotschy! Cienkowsky.*
Occurs also in Arabia.
According to *Schweinfurth,* the Abyssinian name of this plant is *Haschāk.*

2. **G. acaulis,** *Benth. et Hook. f. Gen. Pl.* ii. p. 337. Low-tufted cottony herb 3–6 in. high; stem very shortly branched or obsolete. Leaves linear or oblong, crowded, subobtuse, apiculate, quite entire, somewhat attenuate towards the base sessile, 1–$3\frac{1}{2}$ in. long by $\frac{1}{8}$–$\frac{1}{2}$ in. wide. Capitula ovoid, $\frac{1}{3}$ in. long, subsessile, concealed by the bases of surrounding leaves, solitary, densely cottony outside. Inner involucral scales lanceolate, ciliate. Receptacle densely supplied with long-fringed fimbrillæ. Achenes hirsute. Outer pappus paleaceous, scales oval, obtuse, not awned; inner awned.—*Diplostemma acaule* and *Araschcoolia acaulis,* Schultz Bip. in Hb. Kotsch. Nubic. n. 104.

Nile Land. Cordofan, *Kotschy!* Abyssinia, *Hildebrandt,* fide Vatke in Oesterr. Bot. Zeitschr. 1875, p. 327.

50. ONDETIA, Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 338.

Capitula heterogamous radiate; ray-florets 1-seriate ♀. Involucre nearly globose, of numerous ∞-seriate laxly imbricate scarious glabrate bracts. Paleæ rigid. Corolla of ray with elliptic or ovate minutely toothed limb, of disk tubular 5-fid. Anther-base obtusely sagittate. Achenes subterete silky-pilose. Pappus narrowly paleaceous, paleæ subbiseriate unequal.—Much branched herb, puberulous or glabrate, with alternate narrow leaves and solitary terminal capitula.

A monotypic genus.

1. **O. linearis,** *Benth. in Hook. Ic. Pl.* 1112. Decumbent diffusely branching herb, suffruticose at the base, pale green, puberulous-glandular, about 9 in. high; branches narrowly alate above. Leaves linear, acute, apiculate, sessile, narrowly decurrent, distantly denticulate often obsoletely so, 1–2 in. long by $\frac{1}{16}$–$\frac{1}{6}$ in. wide. Capitula subglobose, $\frac{3}{4}$ in. wide by $\frac{1}{2}$ in. high, solitary, sessile, with bract-like leaves at base. Scales of involucre pluriseriate, scarious, obtuse or subacute, mucronate, ciliate, otherwise nearly glabrous; inner lanceolate, outer successively short, outermost subrotund. Fl. subtended by linear-lanceolate ciliate paleæ longer than themselves.

South Central? 23° S. Lat. Used as a perfume, *Chapman and Baines!*

51. **ANISOPPAPUS,** Hk. et Arn.; Benth. et Hook. f. Gen. Pl. ii. 339.

Capitula heterogamous, radiate, hemispherical; ray-florets ♀, 1–2-seriate. Involucral bracts pauciseriate, oval or oblong, unequal; paleæ folded, sheathing the disk-florets. Ligule spreading, 3-dentate. Corolla of disk-florets tubular, 5-toothed. Anther-base sagittate. Achenes subterete, costate. Pappus coroniform of short free or nearly free laciniate scales, with alternating longer narrow bristles or scales simply unequal in breadth or but slightly irregular.—Scabrid or pubescent erect herbs with alternate toothed leaves and lax terminal cymose corymbs of yellow medium-sized capitula.

The only species are represented in this Flora.

Leaves deltoid-lanceolate. Pappus slightly irregular or unequal . 1. *A. africana.*
Leaves oblong-lanceolate. Pappus of narrow and broad paleæ . . 2. *A. chinensis.*

1. **A. africanus,** *O. & H.* Erect herb, 3–4 ft. high, covered with short crisp puberulence; stem and branches subterete, striate. Leaves deltoid ovate or oblong, obtuse, crenate, at base hastate, 1–3 in. long by $\frac{1}{2}$–$1\frac{1}{3}$ in. wide, uppermost smaller; petioles $\frac{1}{4}$–$\frac{3}{4}$ in. long. Capitula hemispherical, $\frac{1}{2}$–$\frac{2}{3}$–1 in. diameter without including the long ligules of the yellow ray-fl., on distinct robust long peduncles, corymbose. Scales of the involucre pauciseriate, unequal, subobtuse. Receptacle $\frac{1}{3}$ in. diameter, convex, punctate, with long linear acute scales surrounding the disk fl. Achenes setulose or glabrate.—*Telekia africana*, Hook. fil. in Journ. Linn. Soc. vii. p. 201.

Upper Guinea. Cameroon Mountains, 7,000 ft. alt., *Mann!*
Nile Land. Niamniam-land, *Schweinfurth!*

2. **A. chinensis,** *Hook. et Arn. Bot. Beech.* p. 196. Strict erect herb, 1 ft. high; root fibrous; stem simple below, terete, striate, shortly pubescent, somewhat branched above; branches subangular, with short crisp pubescence. Leaves narrowly oval, obtuse and obtusely dentate, cuneately narrowed into petiole, scabrid-puberulous, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long by $\frac{1}{4}$–$\frac{1}{2}$ in. wide; petioles in length about the width of the leaves, gradually dilating at base. Capitula hemispherical, $\frac{1}{2}$–$\frac{2}{3}$ in. diameter, on distinct rigid peduncles forming small lax corymbose terminal cymes. Scales of the involucre pauciseriate, linear-oval, subobtuse, densely puberulous, unequal. Receptacle about $\frac{1}{6}$ in. diameter, with long scales, $\frac{1}{5}$ in. long between the fl.—Oliv. in Trans. Linn. Soc. Lond. xxix. p. 97, t. 64. fig. B. *Verbesina chinensis*, L., DC. Prod. v. p. 618, *fide* Benth. in Fl. Hongk. 180.

Nile Land. Madi. Sandy soil and near burn, common. Flowers yellow. (*Poloa*? sp. Speke, Journ., App. p. 638.) *Speke and Grant!*
Occurs also in South China.

52. **ODONTOSPERMUM,** Neck.; Benth. et Hook. f. Gen. Pl. ii. p. 340.

Capitula heterogamous, radiate, hemispherical or broadly campanulate; ray-florets ♀, in 1 or 2 rows; disk-florets ☿, fertile. Involucre

lucral bracts pauciseriate, ovate or linear, unequal; the inner ones dry; the outer herbaceous or foliaceous. Receptacle slightly convex, furnished with oblong paleæ nearly as long as the florets, the outer paleæ subtending the florets, the inner semi-cylindrical, embracing the florets. Ligules 2–3-dentate. Corolla of the disk-florets tubular, acutely 5-lobed. Anthers sagittate at the base, appendaged with long linear auricles. Style-branches somewhat compressed, rounded and rather dilated at the apex. Achenes costate; those of the ray somewhat compressed or trigonous; those of the disk subterete. Paleæ of the pappus numerous, distinct, scarious, cut towards the apex, equalling the ovary.—Tough herbs or undershrubs, with alternate toothed or entire leaves and solitary heads terminating the lateral and terminal branches.

A genus of about 8 species ranging from the Levant to the Cape de Verde Islands.

1. **O. graveolens,** *Schultz Bip. in Webb et Berth. Phyt. Canar.* ii. p. 232. Shrubby, much-branched, ranging up to 1½ ft. high. Branches rigid, whitish, obsoletely velvety. Leaves pinnately lobed or remotely toothed, often mucronate, sessile, more or less narrowed above the cordate-amplexicaul base, hoary, viscid or shortly hairy, ranging up to 2 in. long. Capitula hemispherical, terminal and subsessile in the forks of the lateral branches, $\frac{1}{3}$–$\frac{1}{2}$ in. diameter, usually involucrate with 1–3 floral leaves at the base. Involucral bracts ovate, puberulous; the outermost linear, mucronate or apiculate, foliaceous. Florets yellow; ligule acutely toothed at the apex, shortly exceeding the disk. Achenes hairy on the ribs.—*Buphthalmum graveolens,* Forsk. Fl. Ægypt.-Arab. p. 151 (1775). *Asteriscus graveolens,* DC. Prodr. v. p. 486 (1836).

North Central. Middle Soudan, *Beurmann,* fide Schweinf. Ber. Beurm. Pfl. in Zeitschr. Allg. Erdk. xv. p. 300 (1863).

Occurs also in Egypt and Arabia.

53. **AMBROSIA,** L.; Benth. et Hook. f. Gen. Pl. ii. p. 354.

Capitula unisexual; of male florets small spicate or racemose, many-flowered, with a broadly hemispherical gamophyllous shortly lobed herbaceous involucre; receptacle nearly plane, with or nearly without filiform paleæ; female capitula sessile or clustered in the upper axils, 1-flowered, apetalous. ♂ corolla white, regular, 5-fid; anthers free or nearly so, base entire. ♀ involucre ovoid or subglose, closed over the achene, usually with 4–6 tubercles or short spines, narrowed above into a short beak.—Herbs or frutescent, more or less hairy with alternate (or opposite) bipinnately divided leaves.

A small widely diffused genus of warm countries.

1. **A. maritima,** *Linn. Sp. Pl.* ed. i. p. 988. A coarse annual, woody below, 1–3 ft. high, whole plant usually very hairy and hoary, much-branched. Leaves ovate, bipinnatipartite, 1–3 in. long; segments obtuse, sometimes toothed. Capitula subsessile, $\frac{1}{8}$–$\frac{1}{6}$ in. diameter,

15–20-flowered, in dense spikes, male at the top and often female below, arranged in a pyramidal or corymbose terminal panicle, leafy at least below. Male involucres crenate, shortly hemispherical, hispid with up-curved scattered hairs; fruiting involucre somewhat turbinate and angular, with 4–5 horns at the top.

Nile Land. From Sennaar northwards.
Widely spread throughout the Mediterranean region.

2. **A. senegalensis,** *DC. Prodr.* v. p. 525. Differs from the preceding species by a more slender habit, less hairy and less hoary surface, and by its less dense spikes.

Upper Guinea. Senegambia, *Roger!* Niger, *Barter!* St. Thomas, *G. Don.*
North Central. Bornu, *E. Vogel!*
Mozamb. Distr. Moramballa, *Kirk!*
Perhaps, as De Candolle suggests, and as Boissier, Fl. Orient. iii. p. 252, has concluded, this is only a variety of *A. maritima*, Linn.

54. **XANTHIUM,** L.; Benth. et Hook. f. Gen. Pl. ii. p. 355.

Capitula unisexual, monœcious; staminate globose, in terminal clusters; pistillate 2-flowered, chiefly axillary. Male capitula with few narrow involucral bracts; florets numerous, sheathed by folded hyaline paleæ; corolla 5-toothed; anthers free or nearly so, base obtuse. Female capitula with an ellipsoidal or ovoid closed gamophyllous aculeate involucre, 2-locellate and 2-rostrate; corolla 0; achenes solitary in each cell of the indurated prickly enclosing involucre.—Coarse scabrid hoary or glabrate annuals, with alternate petiolate palmately lobed leaves.

A small weedy genus widely spread in warm countries.

1. **X. strumarium,** *Linn. Sp. Pl.* edit. i. p. 987. Stem branches and leaves puberulous, without spines, altogether 1–2 ft. high. Leaves deltoid, 3–5-lobate, unequally often coarsely dentate, 1–6 in. broad, base 3-nerved, cordate, sinus wide, cuneate into the petiole of $\frac{1}{2}$–5 in. Capitula nearly sessile, clustered; fruit ellipsoidal, about $\frac{1}{2}$ in. long, terminating in an erect or somewhat curved beak.—*X. antiquorum*, Wallr. Beitr. Bot. part ii. p. 229 (ex descript.). *X. abyssinicum*, Wallr. l.c. p. 230. *X. brevirostre*, Hochst. in Hb. Schimp. Abyss. iii. n. 1958.

Nile Land. Sennaar, *Kotschy!* Abyssinia, *Schimper! Quartin Dillon, Petit.*
A variable plant, widely diffused especially in the warmer regions of the northern hemisphere.

55. **SIGESBECKIA,** L.; Benth. et Hook. f. Gen. Pl. ii. 559.

Capitula heterogamous, yellow; ray-florets 1-seriate, inconspicuous. Involucral bracts usually 3–5, oblong or linear-spathulate; paleæ erect, concave clasping the florets. Ray-florets with a small broadly ligulate or somewhat campanulate toothed limb; corolla of disk-florets tubular with 3–5-dentate campanulate limb. Anther-base entire. Achenes oblong-obovoid, usually incurved, obtuse; pappus 0.—Erect herbs with

opposite simple petiolate toothed or serrate leaves and loosely panicled pedunculate capitula.

A genus of 2 or 3 species, one of which is peculiar to this Flora.

Involucral bracts spreading, linear-spathulate with stipitate glands 1. *S. orientalis.*
Involucral bracts oblong, scarcely exceeding the florets, eglandular or glands sessile . . . . . 2. *S. abyssinica.*

1. **S. orientalis,** *Linn. Sp. Pl.* edit. i. p. 900. Pubescent annual, 1–3 ft. high. Stem erect, sulcate-striate, terete, di- or trichotomously branched. Leaves from deltoid-ovate to lanceolate, $1\frac{1}{2}$–5 by 1–3 in., mostly acuminate, dentate, membranous, often cuneately attenuate into a petiole of $\frac{1}{4}$–$1\frac{1}{2}$ in. Capitula $\frac{1}{4}$–$\frac{1}{2}$ in. diameter, hemispherical, on peduncles ranging up to 1 in., in a usually dichotomous leafy panicle. Bracts of the involucre 3–5, usually elongated and $\frac{1}{4}$–$\frac{3}{8}$ in. long, covered with stipitate glands.

Nile Land. Dalak Island, Red Sea, *Dillon* (t. Klatt).
Widely spread over warmer regions especially in the Old World.

2. **S. abyssinica,** *O. & H.* Scabrid herb, 2–3 ft. high. Stem erect, sulcate-striate, terete, but little branched. Leaves ovate or the upper lanceolate, acuminate, serrulate, membranous, somewhat excavated near the wedge-shaped base, 2–4 by $\frac{1}{2}$–$1\frac{1}{2}$ in.; petioles $\frac{1}{8}$–1 in., amplexicaul. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. diameter, hemispherical, on peduncles ranging up to $\frac{2}{3}$ in., in a leafy narrow panicle. Bracts of the involucre 4–5, oblong, pubescent, $\frac{1}{6}$ in. long, obscurely 5-nerved, exceeding the paleæ. Some minute sessile glands are scattered over the bracts of the involucre.—*S. orientalis* (forma), Benth. et Hook. f. Gen. Pl. ii. p. 359. *Limnogenneton abyssinicum*, Schultz Bip. in Walp. Rep. vi. p. 147. *Cryphiospermum abyssinicum*, Schultz Bip. in Hb. Schimp. Abyss. ii. n. 1059, and in Walp. l. c.

Nile Land. Abyssinia, *Schimper! Quartin Dillon.*
Differs from *S. orientalis*, L., by much shorter outer involucral bracts, without stalked glands.

56. **ENHYDRA,** Lour.; Benth. et Hook. f. Gen. Pl. ii. 360.

Capitula axillary, heterogamous; ray-florets multiseriate, inconspicuous, pistillate. Involucral bracts 4, broad, leafy, opposed in pairs. Paleæ closely sheathing the florets of the prominent receptacle. Disk-florets with regular 5-toothed corolla. Anther-base obtuse, entire. Achenes oblong, angled or subterete; pappus 0.—Erect or creeping herbs of wet places, with opposite sessile or shortly petiolate narrow leaves, and axillary sessile or subsessile roundish whitish or greenish capitula.

A genus common to the Tropics of both hemispheres.

1. **E. fluctuans,** *Lour. Fl. Cochinch.* p. 511. A marsh or aquatic perennial herb, 1–2 ft. high. Stem elongated, rooting, creeping or ascending, simple or branched, glabrous or scabrid-pubescent above. Leaves linear or linear-lanceolate, glabrous or slightly pubescent, entire or toothed, very shortly petiolate, 1–3 in. long, base subhastate or

narrowed; petiole usually dilated. Capitula $\frac{1}{4}$–$\frac{1}{2}$ in. diameter, with the spreading involucre $\frac{1}{2}$–$\frac{3}{4}$ in. diameter. Bracts of the involucre ovate or oval.—*E. longifolia*, *E. paludosa*, and *E. Heloncha*, DC. Prodr. v. p. 637. *Cœsulia radicans*, Willd. Sp. Pl. iii. 1797. *Cryphiospermum repens*, P. Beauv. Fl. Owar. ii. 25, t. 74. *Meyera guineensis*, Spreng. Syst. Veg. iii. 602. *Wahlenbergia globularis*, Schum. et Thonn. Guin. Pl. 387.

Upper Guinea. Old Calabar, *Mann!* Fernando Po, *Mann! Barter!* Niger, *Vogel!*

Lower Guinea. Loango, *Soyaux!*

Widely spread in the East Indies and extending to New South Wales; some Brazilian specimens do not seem to differ.

57. **ECLIPTA**, L.; Benth. et Hook. f. Gen. Pl. ii. 361.

Capitula heterogamous, radiate. Involucre hemispherical of subbiseriate herbaceous nearly equal bracts equalling the head. Paleæ of receptacle narrow, folded, or of centre of receptacle setiform or 0. Ligule of ray-florets small, entire or bidentate. Anther-base entire or nearly so. Achenes somewhat angular, minutely tubercled; pappus 0 or shortly biaristate.—Herbs, usually strigose or hirsute, with opposite entire or toothed leaves and terminal or axillary pedunculate rather small solitary or geminate heads.

A small genus of warm regions.

1. **E. alba**, *Hassk. Pl. Jav. Rar.* 528. An erect or decumbent scabrid herb, $\frac{1}{2}$–2 ft. high; branches striate or sulcate. Leaves lanceolate or narrowly elliptical, narrowed at both ends, more or less scabrid-punctate, very shortly petiolate, ranging up to 5 by 1 in. Peduncles 1–3 together, unequal, slender, ranging up to $2\frac{1}{2}$ in., suberect. Capitula $\frac{1}{4}$–$\frac{1}{2}$ in. diameter, hemispherical. Bracts of the involucre ovate, acuminate, strigose-pubescent. Ray-florets small, white. Tubular florets 4-dentate at the apex. Achenes usually quite glabrous, minutely tubercled.—*E. erecta*, *E. prostrata*, and *E. punctata*, Linn. Mant. alt. 286; together with the other species in the sect. Eu-eclipta, DC. Prodr. v. 490.

Widely spread in Tropical Africa; we have not seen specimens from either of the Central Districts.

A common weed in warm countries.

58. **SCLEROCARPUS**, Jacq.; Benth. et Hook f. Gen. Pl ii. p. 364.

Capitula heterogamous with few neuter ray-florets, or homogamous, all tubular and fertile. Involucre of few leafy bracts equalling or exceeding the head. Paleæ of receptacle cymbiform sheathing the florets. Corolla of disk tubular, short or elongate, 4–5-toothed. Anther-base entire or minutely apiculate. Achenes narrowed below; pappus 0 or reduced to a minute annulus.—Erect scabrid herbs with alternate or

occasionally opposite simple leaves and yellow terminal capitula, solitary or loosely cymosely panicled.

A small tropical genus of both hemispheres.

Heads solitary or nearly so, much overtopped by involucral bracts. Ray present. Paleæ beaked	1. *S. africanus.*
Heads panicled, but little exceeded by involucral bracts. Ray 0	2. *S. ? discoideus.*

1. **S. africanus,** *Jacq. Ic. Pl. Rar.* ii. p. 17, t. 176. Erect somewhat hispid-pilose annual, 1–4 ft. high; branches striate. Leaves mostly alternate, ovate or ovate-lanceolate, acute, narrowed at the base into the petiole, rather remotely serrate, 1–6 by $\frac{1}{2}$–$2\frac{1}{4}$ in.; petioles ranging up to $\frac{1}{2}$ in. Capitula sessile subsessile or pedunculate, terminal or leaf-opposed, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., with foliaceous bracts at the base. Peduncles ranging to $1\frac{1}{2}$ in. Ray-florets 3; ray $\frac{1}{8}$–$\frac{1}{6}$ in. long. Fertile florets about 10–12. Corolla elongated with narrowly lanceolate lobes. Receptacle-paleæ cymbiform, $\frac{1}{3}$–$\frac{1}{2}$ in. long in fruit, gibbous and with an elongated neck at apex, pubescent, wrapped round the fertile florets. Style-branches elongated, slender.

Upper Guinea. Niger, *Barter! Ansell! Thonning.*
Nile Land. Cordofan, *Kotschy!* Abyssinia, *Schimper! Hildebrandt.* Gallabat, *Schweinfurth!*
Mozamb. Distr. Tette, *Kirk!*
Occurs also in India in cornfields, etc.; perhaps introduced.

2. **S. ? discoideus,** (*Benth. et Hook. f. Gen. Pl.* ii. p. 364;) *Vatke in Linnæa* xxxix. p. 495 (1875). A viscid-puberulous trichotomously branched erect annual, 1–2 ft. high. Leaves all except the floral ones opposite, lanceolate, subsessile, serrulate, about 1–2 by $\frac{1}{2}$ in., base broad. Capitula $\frac{1}{2}$ in. diam., pedicellate, arranged in a terminal leafy corymbose panicle. Pedicels $\frac{1}{4}$–$1\frac{1}{2}$ in. Bracts of the involucre 5–6, more or less foliaceous exceeding the florets. Ray-florets wanting. Disk-florets numerous. Corolla-tube short crass hairy; limb short, lobes 4 roundly ovate. Paleæ of the receptacle cymbiform shortly acuminate, glandular and hairy on the back, wrapped round the florets but not the fruits.—*Guizotia discoidea,* Schultz Bip. in Schweinf. Fl. Æthiop. p. 150.

Nile Land. Abyssinia, *Schimper!*

59. **BLAINVILLEA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. 369.

Capitula heterogamous radiate or discoid, outer florets ♀. Involucre ovoid or hemispherical; scales slightly unequal outer herbaceous inner paleaceous passing into the plicate scales of the receptacle. Ray or outer florets with a small 2–3-dentate ligule or more or less regularly 2–3-fid. Anther-base obtuse entire. Achenes 3-cornered or biconvex; pappus of 2 or 3 stout setæ without intermediate scales.—Erect or trichotomous scabrid herbs, with opposite or alternate ovate or lanceolate leaves. Capitula yellow or whitish, terminal, in loose cymose panicles, often singly in the forks.

A small wide-spread tropical genus.

Achenes (at least the outer ones) 3-sided; sides glabrous.	
Achenes transversely marked with minute wrinkles, not tubercled; leaves dark green, hirsutely scabrid . .	1. *B. Gayana.*
Achenes more or less tubercled; leaves ashy green, hispidly scabrid	2. *B. rhomboidea.*
Achenes doubly convex, not 3-sided, villous	3. *B. Prieureana.*

1. **B. Gayana,** *Cass.! in Dict. Sc. Nat.* xlvii. p. 90. Erect, hirsute, scabrous annual, of 1½–3 ft. or more; stem striate, somewhat angular; branches alternate or opposite. Leaves ovate or the upper lanceolate, acuminate, alternate or opposite, unequally serrate, shortly cuneate at the 3-nerved base, ranging up to 4½ by 2½ in. besides petioles of 1⅔ in. Capitula solitary in the forks or loosely panicled, obovoid-oblong or in fruit hemispherical, ⅜–½ in. long. Peduncles ranging up to 2 in. Outer bracts of involucre lanceolate-oblong acute striate hairy outside, equalling the florets; inner similar but glabrous, jagged at apex. Achenes (at least the outer ones) blackish, obconic-oblong, 3-sided sometimes hispid in the angles, minutely transversely wrinkled, ¼ in. long, crowned with 3 barbellate setæ nearly half as long as the achene.

Upper Guinea. Senegambia, Gambia, *Perrottet; Bidjem!*
Nile Land. Abyssinia, *Schimper!*

2. **B. rhomboidea,** *Cass.! in Dict. Sc. Nat.* xxix. p. 494. Erect di-trichotomous scabrid annual, 1–3½ ft. high. Stem striate subterete; branches alternate or opposite. Leaves lanceolate, alternate or opposite, tapering towards the apex, crenate-serrate, ashy green, narrowed to the 3-nerved base, ranging up to 3 by 1 in., besides petiole of ⅔ in. Capitula hemispherical, ¼–⅜ in. long, 1–2 together, in a panicled leafy cyme. Peduncles ranging up to 1¼ in. Outer scales of the involucre oval-oblong, subobtuse, hairy outside at least towards apex, striate below; inner mostly shorter and jagged at apex. Achenes (at least the outer ones) obconic-oblong, 3-cornered, glabrous except the angles (in our specimens), more or less tubercled, terminated by 3 barbellate setæ.—*Eisenmannia clandestina,* Schultz Bip. in Herb. Kotschy n. 191.

Nile Land. Cordofan, *Kotschy!* Abyssinia, *Ehrenberg!*
Mozamb. Distr. Lower Zambesi, between Tette and the sea coast, *Dr. Kirk!*
Our specimens differ from a type specimen that we have seen and from Brazilian ones in the tubercles on the achenes; the Zambesi specimen is sparingly tubercled. An Arabian specimen is also tubercled. Extends also to India.

3. **B. Prieureana,** *DC. Prodr.* v. p. 492. Erect hispid-scabrid trichotomously branched annual, of 1–2 ft. or more. Stem and lower branches sulcate-striate, angular. Leaves opposite or alternate, ovate-lanceolate or the upper ones lanceolate, triplinerved, tapering or acuminate, serrulate or nearly entire, acuminately narrowed to a 1-nerved base, 1–5 by ¼–2 in.; petioles not exceeding ½ in. Capitula hemispherical, ¼–⅓ in. long, numerous, in a panicled leafy cyme; peduncles slender, simple or branched, ranging up to 2 in. Outer scales of the involucre linear-oblong, obtuse, entire, strigose-hispid outside, lax, green, the length of the head; inner ones glabrous or ciliate,

smooth, entire or somewhat jagged at apex. Achenes doubly convex, somewhat compressed, villous, terminated by 2 smooth glabrous setæ.

Upper Guinea. Senegambia, Bakel Mountains, *Leprieur;* Albreda, River Gambia, *Perrottet!*

Nile Land. Gallabat, near Matamma, *Schweinfurth!*

Schweinfurth in Beitr. Fl. Æthiop. p. 142, gives Cordofan for this species.

60. **WEDELIA,** Jacq.; Benth. et Hook. f. Gen. Pl. ii. p. 370.

Capitula heterogamous radiate; ray-florets ♀. Involucre campanulate or hemispherical; scales sub-2-seriate, outer herbaceous, inner dry passing into the plicate entire or toothed scales of the receptacle. Corolla of ray-florets ligulate spreading yellow. Anther-base entire or minutely sagittate. Achenes oblong or obovoid, with a cupuliform subentire or fimbriate pappus (obsolete in our specimens of *W. biflora*) with or without 1 or 2 prominent setæ.—Herbs or undershrubs often scabrid or hirsute, with opposite ovate or lanceolate leaves and terminal solitary or loosely cymose-panicled capitula of medium size.

A considerable genus common to the tropics of both hemispheres.

Achenes none furnished with setæ.

Pappus wanting. Leaves ovate or oval	1. *W. biflora.*
Pappus cup-shaped. Leaves lanceolate-oblong . . .	2. *W. africana.*

Achenes, at least the central ones, furnished with 2 setæ.

Hairs on the shoots spreading. Setæ of the pappus nearly smooth	3. *W. mossambicensis.*
Appressedly strigose-scabrid. Setæ of the pappus barbellate.	
Herbaceous	4. *W. Menotriche.*
Shrubby	5. *W. abyssinica.*

1. **W. biflora,** *Wight Contrib. Bot. Ind.* p. 18. A nearly glabrous or somewhat scabrid straggling perennial herb, sometimes shrubby at the base. Leaves ovate or oval, obtuse or shortly acuminate, acutely narrowed at the base into the petiole, scattered with short strigose hairs, serrate or crenulate, 1–2½ by ½–1¾ in.; petioles slender, pubescent and clasping at base, ½–1 in. Capitula depresso-globose, about ½ in. diam., 2–4 on long or short peduncles at the apex of the stem or sometimes more numerous in an open corymb. Scales of involucre oval-oblong, strigulose, nearly equal, about the length of the ligules. Achenes turbinate, obtuse along the three angles, glabrous. Pappus wanting in our specimens.—*Verbesina biflora,* Linn. Sp. Pl. ed. 2, p. 1272; *Wollastonia biflora,* DC. Prodr. v. 546; *Wollastonia scabriuscula,* DC. ex Decaisne, Herb. Timor. in Nouv. Ann. Mus. Par. iii. 414; *Wollastonia zanzibarensis,* DC. Prodr. v. 547; *Anthemiopsis macrophylla,* Bojer ex DC. l. c.

Mozamb. Distr. Goa Island, *Peters!* Zanzibar, *Bojer;* Mafia Island, Mozambique, *Forbes!*

Widely spread from S. China, over India and the Indian Archipelago to N. Australia. The extra-African synonymy is not given, and the description applies to the African specimens.

2. **W. africana,** *P. Beauv. Fl. Ow.* vol. ii. p. 19, t. 69. Straggling pubescent perennial herb, a foot and a half or more high. Branches

opposite, herbaceous and terete and more or less patently pubescent above. Leaves lanceolate-oblong, narrowed above, broad near the shortly petiolate base, strigose-hispid, serrate or remotely denticulate, rugose-venose beneath, $\frac{2}{3}$–$3\frac{1}{2}$ by $\frac{1}{4}$–$1\frac{1}{8}$ in. Capitula solitary on slender peduncles at the extremities of the stem and branches, hemispherical, $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; peduncles ranging up to $2\frac{1}{4}$ in. Scales of the involucre linear-oblong, obtuse, strigose, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Achenes angular, oblong, glabrescent, tipped by a cup-shaped ciliate pappus, without setæ.

Upper Guinea. Warree, River Formoso, *P. Beauvois;* Sierra Leone, *Winwood Reade! Afzelius!*

3. **W. mossambicensis.** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 97, excl. syn. An erect hirsute-hispid perennial. Branches several from a woody stock, subsimple, striate, herbaceous above, 1 ft. or more high. Leaves ovate or the upper lanceolate, acuminate, denticulate, strigulose-hirsute, narrowed at the base to the very short petiole, 1–$3\frac{1}{2}$ by $\frac{1}{3}$–$1\frac{1}{4}$ in. Capitula solitary on slender peduncles, hemispherical, 1 in. diam. Outer scales of involucre lanceolate, strigose, $\frac{1}{2}$ in. long; inner smaller. Ligules oval-oblong, $\frac{3}{8}$–$\frac{1}{2}$ in. long, longitudinally streaked. Achenes of the disk-florets hairy or glabrescent, tipped by a short cup-shaped pappus, as well as by 2 nearly smooth setæ.—*Wedelia*, Sp. No. 1, T. Thoms in Speke, Journ., App., p. 638.

Mozamb. Distr. 6° S. lat., alt. 3800 ft., *Speke and Grant!*

4. **W. Menotriche,** *O. & H.* A strigose-scabrid herb. Branches opposite, terete. Leaves opposite, lanceolate, acuminate, denticulate or entire, narrowed at the base into the short petiole, with prominent veins beneath, 1–4 by $\frac{1}{3}$–1 in. Capitula campanulate-hemispherical, about $\frac{1}{2}$ in. diam., solitary, erect. Peduncles 2–3 in. long, 1-headed or sometimes branched below. Outer scales of the involucre foliaceous, lanceolate, acuminate, $\frac{1}{2}$–$\frac{2}{3}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, spreading; inner ones smaller, coriaceous below, foliaceous above. Ligule of the ray-florets oblong, golden, $\frac{1}{2}$–$\frac{3}{4}$ in. long, marked with 5–6 blackish longitudinal lines. Achenes of the disk-florets obconic, thick, doubly convex, compressed or obsoletely 4-sided, tipped with two subulate barbellate setæ. Inner pappus paleaceous, short.—*Menotriche strigosa*, Steetz in Peters Mossamb. Bot. p. 475.

Mozamb. Distr. Rios de Sena, *Peters!* Zanzibar Coast, at Mombassa, an undershrub, March, 1876, *Hildebrandt!* United with the following by Vatke.

A specimen from Zambesi-land, collected by Dr. Kirk, with obtuser involucral scales and the inner ones not foliaceous may perhaps belong to this species,

6. **W. abyssinica,** *Vatke in Oesterr. Bot. Zeitschr.* 1875, p. 327. A shrub, a yard high. Stem erect, branched above, terete, strigose; branches 16 in. long. Leaves ovate or oblong-lanceolate, acute, repand-subserrate, scabrous above or shaggy on both surfaces, 3-nerved, shortly petiolate, $1\frac{1}{2}$–$3\frac{1}{6}$ by $\frac{2}{5}$–$\frac{4}{5}$ in. Capitula on long pedicels, 1–3 at the extremities of the branches; ray-florets orange-coloured, female; disk-florets yellow. Involucral bracts ovate-lanceolate, rather obtuse, strigose hairy, in about 2 rows. Scales of the receptacle oblong-linear,

mucronate-acute. Achenes obovoid-oblong, somewhat compressed, strigose-hairy, abruptly terminating in a short neck. Outer pappus composed of 2 rather long aristæ; inner of several little scales.—*Wirtgenia frutescens*, Schultz Bip. in Schweinf. et Aschers. Enum. p. 287 (1876, without description).

Nile Land. Abyssinia, at Hababb, rare, August, 1872, *Hildebrandt.*

The description is taken from Vatke, *l. c.*; the plant may prove identical with the preceding species.

Verbesina ciliata, Schum. Beskr. Guin. Pl. p. 391, from Guinea, is unknown to us.

61. **ASPILIA**, Thouars; Benth. et Hook. f. Gen. Pl. ii. p. 371.

Capitula heterogamous, radiate; ray-florets neuter, ligule rarely exceeding $\frac{1}{2}$ in. often much shorter. Involucre hemispherical or campanulate; bracts 2–3-seriate, outer more or less herbaceous, occasionally foliaceous, inner dry passing into the conduplicate paleæ of the receptacle. Anther-base entire or minutely 2-dentate. Achenes obovoid or oblong, pappus cupuliform with or without 2–3 setæ, sometimes separated from the achene by a constriction.—Scabrid or hispid herbs with opposite leaves and terminal solitary or loosely cymose heads of medium size with a yellow whitish purple or chocolate-coloured ray.

A considerable genus common to the tropics of both hemispheres. The following species appear to be endemic.

Flowers yellow. Achenes usually spotted (*Wirtgenia*).
- Uppermost leaves not involucrate.
  - Achenes furnished with two apical setæ of moderate size.
    - Outer involucral bracts falling short of the disk-florets, Setæ of the achenes $\frac{1}{16}$ in. long . . 1. *A. multiflora.*
    - Outer involucral bracts equalling or exceeding the disk-florets. Setæ of the achenes $\frac{1}{10}$–$\frac{1}{8}$ in. long.
      - Strigose. Leaves cuneate at base. Peduncles ranging up to 2 in. . . . . 2. *A. Schimperi.*
      - Hispid. Leaves mostly rounded at base. Peduncles usually short . . . . . 3. *A. abyssinica.*
  - Setæ of the achenes very short or obsolete.
    - Leaves ovate or oval.
      - Outer involucral scales ovate or lanceolate, about equalling the disk-florets . . . . 4. *A. latifolia.*
      - Outer involucral scales linear-lanceolate, shorter than the florets . . . . . 5. *A. Smithiana.*
    - Leaves linear.
      - Outer involucral scales obtuse . . . . . 6. *A. angustifolia.*
      - Outer involucral scales acute . . . . . 7. *A. linearifolia.*
- Uppermost leaves involucrate . . . . . 8. *A. rudis.*

Florets of the ray white or pale red. Achenes indistinctly spotted (*Coronocarpus*) . . . . . 9. *A. helianthoides.*

Florets of the ray dark purple. Achenes not spotted (*Dipterotheca*) . . . . . 10. *A. Kotschyi.*

1. **A. multiflora**, *O. & H.* Slender subscabrous herb with spreading branches. Leaves ovate or lanceolate, obtusely acuminate, denticulate, suddenly narrowed near the base, shortly petiolate, $\frac{3}{4}$–$1\frac{2}{3}$ by $\frac{1}{8}$–$\frac{1}{2}$ in., strigulose; petioles $\frac{1}{12}$–$\frac{1}{6}$ in. Capitula campanulate, $\frac{1}{4}$ in.

long, pedunculate, in a lax leafy panicle ; peduncles ranging up to 1 in. Outer involucral scales linear-oblong, obtuse, strigulose, not foliaceous, shorter than the florets. Achenes turbinate, silky-villous, indistinctly spotted, $\frac{1}{6}$ in. long, truncate at apex with a narrow short cup-shaped pappus and 2 rather short setæ of about $\frac{1}{16}$ in.—*Wirtgenia multiflora*, Fenzl in Flora, 1844, p. 312.

Nile Land. Sennaar, *Kotschy!*

2. **A. Schimperi,** *O. & H.* Erect, more or less branched annual, 1–3 ft. high. Stem and branches strigulose not hispid. Leaves ovate-lanceolate or lanceolate, acuminate, connate at the base, denticulate, strigulose, 1–5 by $\frac{1}{4}$–2 in. ; petioles ranging up to $\frac{3}{4}$ in. Capitula campanulate in flower, hemispherical in fruit, $\frac{1}{4}$–$\frac{1}{3}$ in. long, pedunculate, in lax open leafy cymes. Outer involucral scales herbaceous obtuse linear-oblong, not or scarcely foliaceous, equalling or rather exceeding the florets, strigose. Peduncles ranging up to 2 in. long, strigulose. Ligule of the ray-florets oval, $\frac{1}{5}$ in. long, yellowish. Achenes turbinate, $\frac{1}{8}$ in. long, silky-villous, spotted, cordate-truncate at apex with a short narrow cup-shaped pappus and 2 long setæ of $\frac{1}{8}$ in.—*Wirtgenia Schimperi*, Schultz Bip. in A. Rich. Fl. Abyss. i. p. 412.

Nile Land. Abyssinia, *Schimper !* Nubia, fide Schweinf. et Aschers. Enum. p. 287.

Steetz in Peters Mossamb. Bot. p. 490 in note unites this with the following species.

3. **A. abyssinica,** *O. & H.* An erect hispid annual, 1–1½ ft. high, branched at least above. Leaves ovate, acuminate, acute, serrulate, rounded or somewhat narrowed at the base, strigose, 2–3 by $\frac{1}{2}$–1 in. ; petioles $\frac{1}{4}$–$\frac{1}{3}$ in. Capitula campanulate in flower subglobose in fruit, $\frac{1}{3}$ in. long, pedunculate, in corymbose leafy cymes ; peduncles slender, pubescent, usually short but ranging up to 1½ in. Outer involucral scales herbaceous above, not foliaceous, linear-lanceolate, not or scarcely acute, strigose, equalling or rather exceeding the flowers ; inner paleaceous obtuse or mucronate. Ligule of the ray-florets $\frac{1}{10}$–$\frac{1}{6}$ in. long, bifid, yellow according to Schultz. Achenes turbinate-oblong, obtuse at both ends, doubly convex, silky-villous, spotted with black blotches and minute reddish ones, $\frac{1}{5}$ in. long, truncate-cordate at apex, with a narrow short cup-shaped laciniate pappus and 2 smooth acicular setæ $\frac{1}{12}$–$\frac{1}{10}$ in. long.—*Wirtgenia abyssinica*, Schultz Bip. in Walp. Rep. vi. p. 146.

Nile Land. Abyssinia, *Schimper !*

4. **A. latifolia,** *O. & H.* More or less hispid herb, 1½–4 ft. high. Branches patently hairy at least above. Leaves ovate, acuminate or subobtuse, serrulate, obtuse at or near the base, strigose or at least scabrid above, 3-nerved near the base, 1½–5 by ½–2¼ in. ; petioles $\frac{1}{8}$–$\frac{3}{8}$ in., patently pubescent. Capitula hemispherical, about ½ in. long, pedunculate, solitary at the ends or forks of the branches ; peduncles ranging up to 8 in. Outer scales of the involucre ovate or lanceolate, subacute, herbaceous, not foliaceous, strigose and often pubescent,

about equalling the disk-florets. Ligules of (20) ray-florets yellow, oblong, $\frac{1}{3}$–$\frac{2}{5}$ in. long. Achenes (immature) linear, strigose. Pappus cup-shaped; setæ obsolete or very short.—*Coronocarpus helianthoides*, Benth. in Hook. Fl. Nigrit. p. 434, non Schum. et Thonn.

Upper Guinea. Accra, *Vogel!* Niger, *Baikie!* Old Calabar, *Mann! Monteiro!*
Nile Land. Djur-land, *Schweinfurth!* Niamniam-land, *Schweinfurth!*

5. **A. Smithiana,** *O. & H.* Scabrous annual, $1\frac{1}{2}$–2 ft. high or more, with straggling branches. Leaves oval or ovate, usually obtuse, remotely serrulate, narrowed at the base, shortly petiolate, 1–$2\frac{1}{2}$ by $\frac{1}{3}$–$1\frac{1}{4}$ in., strigulose. Capitula campanulate in flower, hemispherical in fruit, $\frac{1}{4}$–$\frac{3}{8}$ in. long, pedunculate, in a leafy panicled cyme; peduncles ranging up to 1 in. Outer involucral scales linear-lanceolate, herbaceous, not foliaceous, strigulose or scabrid, shorter than the florets. Achenes turbinate-oblong, silky-villous, indistinctly spotted, $\frac{1}{6}$ in. long, rounded at apex with a short narrow cup-shaped pappus and 2 very short or obsolete setæ.

Upper Guinea. Dahomey, *Burton!*
Lower Guinea. Congo, *Chr. Smith!*

6. **A. augustifolia,** *O. & H.* An erect much branched scabrous annual, 2–3 ft. high. Leaves linear, narrowed to an obtuse apex, distantly serrulate, narrowed to a sessile base, 1–5 by $\frac{1}{8}$–$\frac{1}{2}$ in. Capitula campanulate in flower, hemispherical in fruit, $\frac{1}{2}$ in. long, pedunculate, in a lax leafy corymbose cyme; peduncles ranging up to $4\frac{1}{2}$ in. Outer involucral bracts oblong, obtuse, herbaceous, not foliaceous, entire, strigose-scabrid, $\frac{3}{8}$–$\frac{1}{2}$ in. long; inner paleaceous. Ligule of the ray-florets oval-oblong, bifid at apex, $\frac{1}{4}$–$\frac{1}{3}$ in. long, straw-coloured. Achenes turbinate-oblong, silky-villous, spotted with dark blotches and minute reddish ones, rounded at apex with a narrow tubular cup-shaped pappus and 2 short horn-like setæ.

Upper Guinea. Niger, Nupe, *Barter!*

7. **A. linearifolia,** *O. & H.* A branched hispid herb. Branches patently hispid above. Leaves linear, acute or subacute, scarcely narrowed at the subamplexicaul sessile base, distantly serrulate, strigose-scabrous especially above, 1–4 by $\frac{1}{10}$–$\frac{1}{3}$ in. Capitula campanulate-hemispherical, $\frac{3}{8}$ in. long, pedunculate, in a lax open cyme. Outer involucral scales herbaceous, not or scarcely foliaceous, ovate-oblong, acute, strigose, $\frac{2}{5}$–$\frac{2}{3}$ in. long. Ligules of the ray-florets oblong-obovate, $\frac{1}{2}$–$\frac{5}{8}$ in. long. Achenes (immature) linear-oblong; setæ obsolete or very short.

Upper Guinea. Niger, *Baikie!*

8. **A. rudis,** *O. & H.* A coarse rigid very hispid herb, 4 ft. high. Leaves ovate-lanceolate, acutely acuminate distantly serrate, strigose-scabrid above, very hispid below, rounded at the base, very shortly petiolate, $1\frac{1}{4}$–4 by $\frac{1}{3}$–$1\frac{1}{4}$ in. Capitula campanulate, $\frac{3}{8}$ in. long, shortly pedunculate, in small dense terminal cymes, exceeded by the involucrate uppermost leaves; peduncles $\frac{1}{8}$ in. long, slender. Outer involucral scales linear, acute, not exceeding the florets, hairy. Ligule

of the ray-florets linear or oblong, sulphur-coloured, $\frac{1}{6}$ in. long. Achenes oblong, silky-hairy, not spotted, $\frac{1}{6}$ in. long; pappus shallow cup-shaped; setæ obsolete.

Upper Guinea. Niger, Nupe, *Barter!* Prince's Island, *Barter!*

9. **A. helianthoides,** *O. & H.* An erect hispid annual, 1–3 ft. high. Leaves ovate-lanceolate or ovate, serrulate, acuminate, acute, strigose-hispid, somewhat narrowed at and 3-nerved near the base, 1–4 by $\frac{1}{4}$–$1\frac{1}{4}$ in.; petioles ranging up to $\frac{3}{4}$ in. Heads campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, pedunculate, in lax cymes; peduncles ranging up to $1\frac{1}{4}$ in. Outer involucral scales linear, strigose, not foliaceous, shorter than the florets. Ligules of the (8) ray-florets white or pale red. Achenes obovoid-oblong, silky-villous, indistinctly spotted, rounded at apex with a short cup-shaped pappus and very short setæ.—*Coronocarpus helianthoides*, Schum. et Thonn. Pl. Guin. 393, non Benth.; *C. Gayanus*, Benth. in Hook. Niger Fl. p. 434, excl. syn.

Upper Guinea. *Thonning!* Niger, Nupe, *Barter! Baikie!* Quorra, *Vogel!*
Lower Guinea. Loango, *Soyaux!*

10. **A. Kotschyi,** *Benth. et Hook. f. Gen. Pl.* ii. p. 372, *ex Oliv. in Trans. Linn. Soc. Lond.* xxix. 98. An erect, branched, scabrid, hispid annual, 1–4 ft. high. Leaves varying from lanceolate or oval to linear, mostly acuminate, serrulate or subentire, narrowed and shortly petiolate or rounded subsessile and subamplexicaul at the base, 1–8 by $\frac{1}{4}$–$1\frac{1}{2}$ in., scabrous above, strigose beneath. Capitula hemispherical, $\frac{1}{2}$–$\frac{3}{4}$ in. long, shortly pedunculate, solitary or a few near together overtopped by the uppermost involucrate leaves; peduncles ranging up to 1 in. Outer involucral scales foliaceous, more or less exceeding the florets. Ligule of the ray-florets dark purple, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Achenes turbinate-oblong, silky-villous, $\frac{1}{5}$ in. long, not spotted, truncate at apex with a short cup-shaped pappus, and 2 setæ ranging from $\frac{1}{8}$ in. downwards till they are obsolete.—*Dipterotheca Kotschyii*, Schultz Bip. in Flora 1842, p. 435; *Wirtgenia Kotschyi*, Hochst. in Hb. Schimp. Abyss. iii. n. 1741; *Coronocarpus Kotschyi*, Benth. Fl. Nigrit. 433; *C. Prieureanus*, Benth. l.c., excl. syn.

Upper Guinea. On the Quorra at Attah, *Vogel!* (the flowers are noted as yellow, but as the specimen is far advanced, those of the disk, not those of the ray, may be referred to); Niger, *Barter!* (flowers chocolate-coloured), *Baikie!* Senegambia, *Bidjem!*

Nile Land. Cordofan, *Kotschy! Cienkowsky;* Gallabat, *Schweinfurth!* Abyssinia, *Schimper! Q. Dillon!* Upper Nile, *Speke and Grant! Petherick! and Murie! v. Harnier.*

Lower Guinea. Congo, *Chr. Smith! Burton!* Angola, *Monteiro!* Loango, *Soyaux!*

Mozamb. Distr. Mozambique, *Peters; Hutton!* Zambesi-land, Rovuma River, *Meller!* Zanzibar, *Kirk! Hildebrandt.*

Wirtgenia longeradiata, Hochstett. ex Schweinf. et Aschers. Enum. p. 287, name only, from Abyssinia, is unknown to us.

62. MELANTHERA, Rohr.; Benth. et Hook. f. Gen. Pl. ii. p. 377.

Capitula at length subglobose, radiate (in Tropical African species) yellow; ray-florets pistillate or neuter. Involucre hemispherical;

bracts 2–3-seriate, outer more or less herbaceous, inner dry, sheathing the achenes. Corolla of ray ligulate conspicuous yellow. Anther-base obtuse or minutely sagittate. Achenes thick, 3–4-angled, apex truncate or depressed; pappus of 2 or more distinct caducous setæ, or wanting in the ray-achenes.—More or less scabrid herbs with opposite petiolate leaves and axillary and terminal solitary or loosely cymose at length subglobose heads.

A small genus of Tropical Africa and America.

Leaves on long petioles. Setæ of pappus 6–8, caducous . .	1. *M. Brownei.*
Leaves subsessile. Setæ of disk-pappus 2. Involucral bracts not setaceous-pointed	2. *M. abyssinica.*
Leaves shortly petiolate. Setæ of disk-pappus 2. Involucral bracts setaceous-pointed	3. *M. pungens.*

1. **M. Brownei,** *Schultz Bip. in Flora*, 1844, p. 673. Scabrid herb, sometimes scandent, 2–10 ft. high. Branches obtusely quadrangular, sulcate, asperous, strigulose. Leaves deltoid-ovate, sometimes 3-lobed below, acuminate, subtruncate at the base, dentate, very scabrous above, strigose beneath, 2–6 by 1–3 in.; petioles $\frac{1}{4}$–$1\frac{1}{2}$ in. Capitula $\frac{1}{2}$–$\frac{3}{4}$ in. diameter, in lax nearly leafless terminal cymes; peduncles $1\frac{1}{2}$–6 in. simple or branched. Florets all yellow; those of the ray female. Achenes turbinate, trigonous or compressedly quadrangular, $\frac{1}{10}$ in. long. Pappus of 8–10 short rigid unequal deciduous bristles.—*Buphthalmum scandens*, Schum. et Thonn. Pl. Guin. 392; *Lipotriche Brownei*, DC. Prodr. v. 544.

Upper Guinea. Niger, *Barter! Vogel!* Fernando Po, *Vogel! Mann!* Abbeokuta, *Irving!* Guinea, *Thonning*; Sierra Leone, *Afzelius!*

Lower Guinea. Congo, *Chr. Smith!* Loango, *Soyaux!*

Mozamb. Distr. Zambesi-land, *Kirk!*

Occurs also in Natal, etc.

2. **M. abyssinica,** *Benth. et Hook. f. Gen. Pl.* ii. p. 377. An erect scabrid branched herb 2 ft. high. Leaves ovate-lanceolate, attenuate-acute, serrate, asperous on both sides, subsessile, amplexicaul, $1\frac{1}{2}$–4 by $\frac{1}{4}$–$1\frac{1}{4}$ in. Capitula $\frac{3}{8}$–$\frac{1}{2}$ in. diameter, in corymbose cymes; pedicels ranging up to 3 in. Outer involucral scales 5–6, oval-oblong, pubescent; innermost coloured, narrower. Ray-florets neuter, ligule obtuse obsoletely trifid. Achenes turbinate-oblong, compresso-subquadrangular glabrous, those of the disk with 2 barbellate setæ.—*Wurschmittia abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. i. n. 334, iii. n. 1533; A. Rich. Fl. Abyss. i. p. 413.

Nile Land. Abyssinia, *Schimper! Petit!* Gallabat, *Schweinfurth!*

3. **M. pungens,** *O. & H.* An erect rigid scabrid herb, 4 ft. high or more. Stem and branches obtusely quadrangular, sulcate. Leaves ovate or the upper ones lanceolate, acuminate, shallowly dentate, broad near the somewhat narrowed not truncate base, shortly petiolate, ranging up to 6 by $3\frac{1}{2}$ in. Capitula hemispherical, $\frac{3}{8}$–$\frac{1}{2}$ in. diameter, in a rather lax corymbose cyme, pedicellate. Involucral scales linear-lanceolate, strigulose, subequal, rather falling short of the disk-florets, taper-pointed, especially the inner terminating in barbellate setaceous

points. Achenes with 2 very caducous scabrid setæ exceeding the ovary.

Nile Land. Djur-land, *Schweinfurth !*

63. **XIMENESIA,** Cav. (**VERBESINA,** L.) ; Benth. et Hook. f. Gen. Pl. ii. p. 380.

Capitula hemispherical heterogamous radiate ; ray-florets ♀ ligulate, ligule spreading, deeply toothed, yellow. Involucral bracts 1–2-seriate, herbaceous, linear, acute, often unequal, equalling the disk ; paleæ of receptacle conduplicate sheathing the florets. Anther-base obtuse. Achenes compressed with winged margins ; pappus of 2 aristæ.—Herbs more or less hoary with opposite and alternate leaves and rather large loosely cymose pedunculate heads.

Reduced in the Genera Plantarum l.c. to the American genus *Verbesina.* Being the solitary representative of the genus thus consolidated, we retain it under the old hitherto generally received genus.

1. **X. enceliodes,** *Cav. Ic.* ii. 60, t. 178. More or less hoary branched annual, 1–3 ft. high. Stem and branches pubescent-tomentose, striate. Leaves mostly alternate at least the upper ones, from deltoid to oblong, dentate, broad near the sometimes excavated base, green and strigulose above, hoary with whitish closely appressed tomentum below, $1\frac{1}{2}$–6 by 1–3 in. exclusive of the winged auriculate petiole of $\frac{1}{2}$–2 in. Capitula $\frac{3}{4}$–$1\frac{1}{4}$ in. diameter, on peduncles ranging up to 8 in. Outer bracts of the involucre linear acute herbaceous, about $\frac{1}{2}$ in. long. Receptacle convex. Achenes pilose.—*Pallasia serratifolia,* Sm. in Rees Cycl. vol. xxvi.

A variable widely spread species originally from Mexico.

Var. *oblongifolia.* Leaves oblong, the lower ones ovate. Wing of the achenes rather thickened, opaque, with rather acute lobes.

Upper Guinea. Senegambia, Walo, *Perrottet.*

Nile Land. Khartoom, *Schweinfurth !*

Var. *cana.* Leaves deltoid or lanceolate, very hoary. Wing of the achenes villous, opaque, obtuse.

Nile Land. Kartoom, *Petherick ! Speke and Grant !* Sennaar, cultivated.

64. **SPILANTHES,** L. ; Benth. et Hook. f. Gen. Pl. ii. p. 380.

Capitula heterogamous with a ray of uniseriate shortly ligulate florets, or homogamous ray wanting. Involucral bracts short, much shorter than the disk, 1–2-seriate, outer more or less herbaceous. Receptacle elongate (in Tropical African species), paleæ conduplicate. Anther-base truncate entire or 2-dentate. Pappus 0 or of 2 or 3 setæ. Achenes compressed biconvex or the outer 3-cornered, margins often ciliolate.—Herbs glabrous or pubescent, with opposite leaves and solitary usually long-pedunculate yellow capitula, or ray sometimes whitish.

A wide-spread genus of warm regions of both hemispheres, including either many nearly allied or few variable species.

1. **S. Acmella,** *Linn. Syst. Nat., edit.* xiii., vol. ii. p. 610. Annual, creeping at base or ascending, glabrous or pubescent above, from a few inches to a foot high. Leaves ovate, obtuse, subentire or somewhat dentate, ranging up to 2 by 1 in., mostly narrowed at the base into a petiole of $\frac{1}{8}$–$\frac{3}{8}$. Capitula $\frac{1}{6}$–$\frac{3}{8}$ in. thick, conical or convex; peduncles ranging to 4 in. Ray-florets usually present; ligules sometimes minute or wanting. Achenes glabrous or ciliolate, with or without setæ.—*S. caulirhiza*, DC. Prodr. v. p. 623. *S. africana*, DC. l. c. *S. costata*, Benth. Fl. Nigrit. p. 436. *S. abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. i. n. 134. *Verbesina Acmella*, Linn. Sp. Pl., edit. i. p. 901. *? Eclipta filicaulis*, Schum. et Thonn. Beskr. Guin. Pl. p. 390. *Acmella caulirhiza*, Del. Cent. Pl. Afr. Mér. p. 45, t. iii. f. 7.

Upper Guinea. St. Thomas Island, *G. Don!* Gaboon River, *Mann!* Sierra Leone, *Barter!* Cape Coast and Cape Palmas, *Vogel!* (*S. costata*, Benth., without ray-florets and a rib along one side of the achenes.)

Nile Land. Abyssinia, *Schimper!* Unyoro, *Speke and Grant!* Niamniam-land, *Schweinfurth!* Sennaar, *Cienkowsky.*

Lower Guinea. Congo, *Chr. Smith!* (form with short peduncles and without ray-florets.)

Mozamb. Distr. Roheho Pass, *Speke and Grant!* River Shire, *Dr. Kirk!*

A variable species widely distributed over the warmer parts of the Old World.

65. GUIZOTIA, Cass.; Benth. et Hook. f. Gen. Pl. ii. 382.

Capitula heterogamous with a yellow ray; ray-florets 1-seriate ♀. Involucre hemispherical, bracts free, sub-2-seriate, outer more or less herbaceous or even foliaceous, inner passing into the paleæ of the convex receptacle. Corolla of disk usually more or less glandular-tomentose at base. Anther-base obtuse or 2-dentate. Inner achenes tetragonous, glabrous or nearly so, apex rounded; pappus 0.—Scabrid hirsute or glabrescent herbs with opposite sessile oblong leaves and terminal solitary or cymose capitula of moderate size.

A small Tropical African genus of which one species has been introduced into India, probably for the sake of its oil-affording seeds.

The following species, except the last, were recognized by Schultz and A. Richard; they are, however, difficult of discrimination, and may ultimately prove to be all forms of one much cultivated and variable species.

Leaves undivided. Achenes of the disk quadrangular.
- Outer involucral bracts ovate or ovate-lanceolate.
  - Nearly glabrous. Paleæ of the receptacle glabrous or nearly so. Corolla-tube of the disk-florets hairy . . 1. *G. abyssinica.*
  - Pubescent above. Paleæ of the receptacle loosely pilose towards the tip. Corolla-tube of the disk-florets subglabrous or somewhat hairy . . . . . 2. *G. Schimperi.*
- Outer involucral bracts lanceolate.
  - More or less scabrous. Perennial . . . . . 3. *G. Schultzii.*
  - Villous. Annual . . . . . 4. *G. villosa.*

Leaves tripartite. Achenes (immature) compressed . . . . 5. *G. bidentoides.*

1. **G. abyssinica,** *Cass. in Dict. Sc. Nat.* lix. p. 248. Erect annual, nearly glabrous below, somewhat viscid-scabrid above, 1–5 ft. high. Leaves more or less lanceolate and dentate, somewhat scabrid,

mostly cordate-amplexicaul at the sessile base, ranging up to 9 by 2½ in. Capitula ⅓–¾ in. diameter, pedicelled, in a corymbose or densely pyramidal cyme. Outer involucral bracts ovate or ovate-oblong, appressed. Corolla-tube of the disk-florets with 1–2 tomentose rings at or near the base. Achenes glabrous. Paleæ of the receptacle glabrous or nearly so.—*G. oleifera*, DC. in Mem. Soc. Hist. Genèv. vii. p. 5, tt. 2–3. *Polymnia abyssinica*, Linn. f. Suppl. 383. *Heliopsis platyglossa*, Cass. in Dict. Sc. Nat. xxiv. 332. *P. frondosa*, Bruce, Travels, vii. t. 52. *Parthenium luteum*, Spreng. Nov. Prov. 31. *Tetragonotheca abyssinica*, Ledeb. Ind. Hort. Dorp. Suppl. 1824, p. 7. *Jägeria abyssinica*, Spreng. Syst. Veg. iii. 590.

Nile Land. Abyssinia, *Schimper!* and others.

Much cultivated in Abyssinia and also in India for the extraction of oil.

De Candolle gives the Indian synonymy in Prodr. v. pp. 551–2, and divides the species into the two following varieties.

α. *sativa*. Leaves elongate-lanceolate, coarsely serrate, branchlets elongated, subcorymbose.

β. *angustior*. Leaves linear-lanceolate, somewhat dentate, flowering axillary branches very short.

On the roots of this species grows parasitically *Orobanche abyssinica*, A. Rich. Fl. Abyss. ii. p. 137 (1851).

2. **G. Schimperi,** *Schultz Bip. in Walp. Rep.* vi. p. 158. An erect annual, 2–3 ft. high, pubescent above. Leaves elliptic-ovate, subacute, denticulate, cordate-amplexicaul, sessile, ½–4 by ⅛–1½ in. Capitula hemispherical, ½ in. diameter, in a divaricate cyme; pedicels ranging up to 1¼ in. Outer involucral bracts ovate or ovate-lanceolate, not exceeding the florets. Paleæ of the receptacle loosely pilose towards the tip. Corolla-tube of the disk-florets subglabrous or somewhat hairy at base. Achenes glabrous, $\frac{1}{12}$–$\frac{1}{10}$ in. long.—A. Rich. Fl. Abyss. i. p. 406.

Nile Land. Abyssinia, *Schimper!*

3. **G. Schultzii,** *Hochst. in Hb. Schimp. Abyss.* i. n. 350. An erect scabrous perennial herb, 2–4 ft. high. Leaves narrowly elliptical or lanceolate-oblong, denticulate or serrate, sessile, usually wide near the base, sometimes attenuate, cordate-amplexicaul, often connate, 1–8 by ¼–2½ in. Capitula campanulate or hemispherical, ½–¾ in. diameter, pedicellate, in a lax or dense corymbose or oblong cyme; pedicels ranging up to 5 in. in some forms, usually shorter. Outer involucral bracts lanceolate, acute or subobtuse, exceeding the inner ones. Corolla-tube of the disk-florets hairy. Achenes glabrous, $\frac{1}{10}$–$\frac{1}{8}$ in. long.—Walp. Rep. vi. p. 407. A. Rich. Fl. Abyss. i. p. 407. *Veslingia scabra*, Visiani, Nuovi Saggi della Accademia di Scienze fisiche di Padova, v. 269.

Nile Land. Abyssinia, *Petit! Schimper! Roth!* Djur-land, *Schweinfurth!* Sennaar, *Kotschy!*

Three forms of this species may be noticed.

1. Leaves acute; internodes short. Cymes corymbose; pedicels short.

2. Leaves obtuse, about equalling the internodes. Cymes few-flowered; peduncles elongated.

3. Leaves acute, shining, scarcely scabrous; internodes short. Cymes elongated, dense, pedicels short.

4. **G. villosa,** *Schultz Bip. in Walp. Rep.* vi. p. 158. An erect villous annual, 9–15 in. high, with spreading branches. Stem and branches with spreading hairs. Leaves from elliptical to lanceolate, narrowed at both ends, more or less serrate, sessile, subamplexicaul, $\frac{1}{2}$–3 by $\frac{1}{8}$–$1\frac{1}{2}$ in. Capitula hemispherical, $\frac{1}{4}$–$\frac{3}{8}$ in. diameter, pedicellate, in an open corymbose or somewhat elongated leafy cyme; pedicels slender, ranging up to 2 in. Outer involucral bracts lanceolate, obtuse, exceeding the inner ones. Corolla-tube of disk-florets hairy below. Achenes glabrous, $\frac{1}{15}$ in. long.—A. Rich. Fl. Abyss. i. p. 406.

Nile Land. Abyssinia, *Schimper! Roth!*

5. **G. bidentoides,** *O. & H.* A somewhat pubescent dull herb, a foot or more high. Branches subterete, sulcate or ridged above. Leaves mostly crowded on abbreviated shoots, ovate, 1–3 in. long, tripartite with the terminal lobe again tripartite or undivided, serrate or incise-dentate; petioles $\frac{1}{4}$–$1\frac{1}{2}$ in. long. Capitula hemispherical, about $\frac{1}{2}$ in. diameter, on short pedicels crowded in a dense subglobose cyme $1\frac{1}{2}$–3 in. wide or more. Involucral bracts in 2 rows of 4 in each row, all similar, lanceolate-oblong, $\frac{1}{3}$ in. long. Ray-florets neuter?; ligule $\frac{2}{3}$ in. long. Achenes (immature) compressed. Pappus 0.

Mozamb. Distr. Manganja Hills, 500–3,000 ft. alt., *Kirk!*

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66. *Synedrella nodiflora,* Gaertn., a widely spread weed of American origin, has been stated to occur in Tropical Africa, but we have not seen any specimen.

67. MICROLECANE, Sch. Bip.; Benth. et Hook. f. Gen. Pl. ii. 384.

Capitula heterogamous, radiate, yellow; ray-florets conspicuous, 1-seriate, ♀. Involucre broadly campanulate, duplex; outer series of about 8 linear bracts alternating with and rather shorter than as many ovate-lanceolate membranous-margined inner bracts which are inserted upon a dilated receptacular disk so as to appear connate about one-third their length. Paleæ of receptacle equalling or exceeding involucre, linear-oblong, subobtuse, not conduplicate. Anther-base unappendaged. Achenes compressed, striate, with a minute ciliolate pappus, exaristate.—Herbs with opposite pinnatisect leaves and pedunculate loosely panicled heads of medium size.

A monotypic genus.

To this genus we provisionally refer, the plants—one, in fruit, collected by Col. Grant at Gangi (see Oliv. in Trans. Linn. Soc. Lond. xxix. 99), the other, in early flower, in Schimper's 1862–3 Distribution (No. 1386). They are both destitute of pappus or with but a narrow epigynous disk, but they do not exhibit any tendency to the turbinate dilatation of the receptacular disk characteristic of *M. abyssinica.* In other respects they have all the facies of *Coreopsis.*

The latter plant is given as an elongated slender finely cut form of *M. abyssinica* by Vatke in Linnæa, xxxix. pp. 497-8 (1875).

1. **M. abyssinica,** *Benth. et Hook. f. Gen. Pl.* ii. 384. Erect, 2 ft. high. Stem sulcate-striate, glabrous below, oppositely branched above. Leaves ovate in outline, 1–3 in. long, thinly hispid-pubescent,

shortly petiolate, lobes lanceolate linear or oblong acute. Capitula $\frac{1}{3}$–$\frac{3}{8}$ in. diameter; pedicels 1–2½ in. long, mostly alternate. Achenes $\frac{1}{10}$ in. long, narrowly oblong, black.—*Chrysanthellum* (§ Microlecane) *abyssinicum*, Schultz Bip. in Flora, 1842, p. 440. *Hinterhubera abyssinica*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 150.

Nile Land. Abyssinia, margins of woods in valleys near Adoa, *Schimper!*

68. COREOPSIS, L.; Benth. et Hook. f. Gen. Pl. ii. p. 385.

Capitula heterogamous radiate; ray-florets 1-seriate, conspicuous, ♀ or neuter. Involucre duplex; outer bracts more or less herbaceous, linear or linear-lanceolate, inner membranous, subequal, 1–2-seriate, broader than the outer; bracts sometimes appearing more or less connate at base. Scales of receptacle plane or slightly concave, membranous, striate. Anther-base entire or bidentate. Style-branches truncate or with an abrupt subulate appendix. Achenes usually much compressed, linear oblong or obovate; margins sometimes winged (in the African species thickened), apex with 2 filiform subulate or broad-based aristæ, usually barbellate with setæ directed upwards.—Herbs or frutescent more or less, with opposite often pinnatisect or deeply divided simple leaves and pedunculate solitary or variously cymose yellow conspicuous heads.

A large genus of warm regions; species most numerous in the New World.

Achenes much compressed, with thin or alate margins.
- Aristæ of the achenes filiform, shorter than the achene.
  - Achenes not or scarcely winged.
    - Leaves bipinnatifid. Softly pubescent . . . . . 1. *C. Grantii.*
    - Leaves pinnatisect tripartite or undivided. Glabrous hispid or scabrid.
      - Hispid or scabrid, or nearly glabrous.
        - Tips of the teeth or lobes of the leaves not setaceous.
          - Involucral bracts puberulous or hispid-pubescent.
            - Leaves pinnatisect . . . . . 2. *C. Steppia.*
            - Leaves tripartite or not lobed . . . . . 3. *C. chrysantha.*
          - Involucral bracts hispid with broad compressed hairs. Leaves pinnatifid . . . . . 4. *C. pristinariæformis.*
        - Tips of the teeth or lobes of the leaves setaceous.
          - Leaves tripartite . . . . . 5. *C. glaucescens.*
          - Leaves pinnatisect . . . . . 6. *C. abyssinica.*
      - Quite glabrous.
        - Leaves tripartite.
          - Lobes of the leaves linear . . . . . 7. *C. Kirkii.*
          - Lobes of the leaves ovate . . . . . 8. *C. monticola.*
        - Leaves undivided, oval or lanceolate . . . . 9. *C. Barteri.*
        - Leaves undivided, linear . . . . . 10. *C. linearifolia.*
  - Achenes winged . . . . . 11. *C. guineensis.*
- Aristæ of the achenes subulate, scarcely as long as the winged achene. Perennial . . . . . 12. *C. macrantha.*
- Aristæ of the achenes longer than the winged achene. Annual . . . . . 13. *C. Prestinaria.*

Achenes not much compressed, with a thick rounded not winged edge . . . . . 14. *C. pachyloma.*

1. **C. Grantii,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 98, t. 65. Softly pubescent erect herb, 2–4 ft. high, purplish below. Leaves ovate, bipinnatifid, 1–2 in. long; lobes mostly ovate, rather obtuse, mucronate, entire or with a few teeth. Capitula hemispherical, ½ in. diam., on peduncles of ¼–1½ in., few together, cymose. Outer involucral bracts hispid-pubescent, linear, about as long as the inner pubescent broader ones. Achenes compressed, not winged, setulose on the margins and face, linear, ¼ in. long. Aristæ short, filiform.—*Verbesina,* Nos. 2, 3, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Karagué, *Speke and Grant!*

2. **C. Steppia,** *Steetz in Peters Mossamb. Bot.* p. 496. Erect sparingly hispid herb, 3 ft. high or more. Leaves pinnatisect, ovate in outline, 2–6 in. long, subsessile; lobes 1–2 on each side, oblong lanceolate or linear, more or less toothed or subpinnatipartite, ciliate-scabrous, 1½–3½ in. long, the terminal one longer than the lateral ones. Capitula hemispherical, ½–1 in. diam., on peduncles of ⅛–6 in., subsolitary or in a panicled cyme. Outer involucral bracts hispid-pubescent, linear, ¼–¾ in. long, more or less exceeding the inner. Achenes compressed, linear-oblong, scarcely winged, ciliate, ¼–⅓ in. long. Aristæ strong, filiform, ½–⅙ in. long.

Mozamb. Distr. Rios de Sena, *Peters!* Zambesi-land, *Meller!* Manganja hills, alt. 3,000 ft. *Kirk!*

3. **C. chrysantha,** *Vatke in Linnæa* xxxix. p. 499, (1875); *non alior.* Erect perennial pallid herb, 2–4 ft. high. Stems from a woody stock, striate, glabrous below. Leaves tripartite or (in the variety) not lobed; lobes lanceolate or linear, acutely narrowed at both ends, shortly petiolate, quite entire near both ends, sharply or deeply serrate on other parts of the margin, scabrid above, shortly hispid-pubescent below, ¾–3½ by ⅛–1 in.; petioles ranging up to 1¼ in. Capitula hemispherical, ¼–⅖ in. long, on hispid peduncles of 1⅓–4 in. in a lax open corymbose cyme. Outer involucral bracts linear, puberulous, rather falling short of the inner which are broader and more pubescent. Achenes oblong, ⅙ in. long, slightly hairy upwards, not winged, compressed. Aristæ filiform, shorter than the achene, inconspicuously ciliate.—*C. Rüppellii,* Schultz Bip. in Walp. Rep. vi. p. 163, i. e. *Verbesina Ruppellii,* A. Rich. Fl. Abyss. i. p. 410 (*V. Rueppellii,* ex Vatke) is doubtfully referred by Vatke *l. c.* to this species; it is unknown to us.

Nile Land. Abyssinia, *Petit! Schimper!* (in the Repp Valley at Dewari, 7,000 ft. alt., 2nd Oct., 1863).

The barren radical shoots sometimes have alternate elliptical entire leaves.

? var. *β. simplicifolia,* Vatke, *l. c.* p. 500. Erect, rigid, glaucescent, slightly scabrid, nearly glabrous, perennial herb, 4 ft. high, branched above. Leaves ovate or narrowly elliptical, acutely apiculate, serrate or those of the inflorescence nearly entire, narrowed at the base, subsessile, ranging up to 6 by 1½ in. Capitula hemispherical, involucre ¾ in. diam., in a corymbose lax cyme; pedicels ranging up to 2 in. long. Outer involucral bracts herbaceous, about 7, lanceolate or linear-acuminate, ⅖–⅝ in. long. Ligule of the ray-florets narrowly elliptical, about ½ in. long. Achenes (imma-

ture) somewhat pilose above, with a short laciniate annular pappus and 2 barbellate setæ. Paleæ of the receptacle complicate-concave, embracing the disk-florets.

Nile Land. Abyssinia, among mountains at Dewari, at 7,000 ft. alt. 2nd Oct., 1863, *Schimper!*

This variety of Vatke appears to constitute a distinct species and indeed has the technical characters of *Wedelia*; the general appearance of the plant is however quite that of *Coreopsis*.

4. **C. prestinariæformis,** *Vatke in Linnæa*, xxxix. 499, *excl. syn.* A sparingly setulose annual, ½–2 ft. high, erect or ascending. Leaves ovate, pinnatifid, incise-dentate, mostly obtuse at apex and shortly narrowed at the base, sessile or subsessile, hispid at least on the veins beneath, ½–1½ in. long. Involucres hemispherical, ⅜–⅝ in. diam., on rather slender bracteate or naked peduncles of ¾–1½ in., in lax cymes. Outer involucral bracts linear, glabrous, about as long as the broader inner ones which are hispid with compressed hairs. Ligules of the ray-florets large. Achenes ¼ in. long, linear-oblong, compressed, somewhat silky on the faces, ciliate above, tipped with 2 filiform acute aristæ of ⅛ in.

Nile Land. Abyssinia, in meadows at Gaffat, alt. 8,200 ft. *Schimper! Plowden!*

5. **C. glaucescens,** *O. & H.* Erect perennial herb, about 4 ft. high, thinly pubescent above with weak spreading hairs. Leaves tripartite, ovate, subsessile or petiolate, 1–4 in. long; lobes more or less toothed, mostly lanceolate, the terminal one often deeply trifid, teeth with setaceous tips. Capitula hemispherical, about ½ in. diam., on peduncles of 1½–4 in., solitary or few together, forming a lax open corymbose cyme. Outer involucral bracts linear, hispid-pubescent along the back, equalling or slightly exceeding the lanceolate equally hispid-pubescent inner ones. Achenes linear-oblong, compressed, setulose-margined, not winged, ⅙ in. long. Aristæ filiform, short.

Nile Land. Abyssinia, *Schimper!*

6. **C. abyssinica,** *Schultz Bip. in Walp. Rep.* vi. p. 163. Erect perennial herb, about 3 ft. high, glabrous below, usually scabrid-pubescent above. Leaves pinnatisect, usually scabrid-hispid below, ovate in outline, 1½–4½ in. long, sessile or petiolate, segments 3–4 on each side, opposite, ¼–2½ in. long, lanceolate or linear, more or less toothed or subpinnatipartite, the terminal one the greatest. Capitula hemispherical, about ½ in. diam., on pedicels of ½ to 4½ in., in a lax corymbose cyme. Outer involucral bracts linear, glabrous, equal, ⅛–⅜ in. long, acute, margins minutely scabrous; inner bracts broader, coloured, mostly hispid, exceeding or about equalling the outer. "Achenes compressed almost ⅙ in. long, convex on the back, flat and hairy on the face." Aristæ filiform, shorter than the achene.—*Prestinaria* (Steppia) *abyssinica*, Schultz Bip. in Hb. Schimp. Abyss. i. n. 332; *Verbesina abyssinica*, A. Rich. Fl. Abyss. i. p. 409.

Nile Land. Abyssinia, *Schimper!*

Var. *glabrior.* Glabrous. Pinnæ of the leaves linear.

Nile Land. Abyssinia, *Petit!*

7. **C. Kirkii,** *O. & H.* A glabrous shining perennial, shrubby and branched below. Branches terete. Leaves petiolate, mostly on abbreviated branches, 1–3 in. long inclusive, tripartite, the divisions again tripartite or undivided, lobes linear, $\frac{1}{3}$–$1\frac{1}{2}$ in. long. Capitula solitary or subsolitary, on peduncles $1\frac{1}{2}$–$4\frac{1}{2}$ in. long. Involucre subglobose, $\frac{1}{3}$ in. diam.; outer bracts narrowly linear, about as long as the broader inner ones. Ray-florets neuter; ligule $\frac{5}{8}$ in. long. Setæ of the pappus slender. Ripe fruit not seen.

Mozamb. Distr. Moramballa, alt., 3,000 ft., *Kirk!*

8. **C. monticola,** *O. & H.* A nearly simple erect rigid quite glabrous herb, 1–3 ft. high. Leaves ovate in outline, including the petiole of $\frac{1}{4}$–$\frac{3}{4}$ in. about 2 by $1\frac{1}{2}$ in., tripartite with the middle partition deeply 3–5-fid, lobes ovate, incise-dentate, acute. Capitula hemispherical, $\frac{3}{4}$–$\frac{5}{6}$ in. diam., on peduncles $\frac{1}{2}$–3 in., in a corymbose cyme. Involucral bracts glabrous, shining; outer rather longer, linear, rather obtuse but with a callous tip; inner oval-oblong, rounded at apex. Achenes compressed, linear-oblong, setulose on the margin and apex, not winged, $\frac{1}{5}$ in. long. Aristæ rigid, filiform, shorter than the achene, scabrid.—*Verbesina* (Prestinaria) *monticola*, Hook. f. in Journ. Linn. Soc. Lond. vii. p. 200.

Upper Guinea. Cameroon Mountains, *Mann!*

9. **C. Barteri,** *O. & H.* Ascending glabrous shining perennial herb, 1–3 ft. high. Branches terete striate. Leaves opposite or occasionally 3 in a whorl, oval or lanceolate, obtuse, narrowed into the sessile or subsessile base, serrulate or toothed, undivided, $\frac{1}{2}$–2 by $\frac{1}{4}$–$\frac{3}{4}$ in. Capitula subglobose, $\frac{3}{8}$–$\frac{1}{2}$ in. diam., on peduncles of 1–4 in., in a lax corymbose cyme. Involucral bracts glabrous, outer narrowly linear, rather exceeding or nearly equalling the broader inner ones. Achenes linear or linear-oval, ciliate, compressed, not winged, margined, $\frac{1}{8}$–$\frac{1}{5}$ in. long. Aristæ filiform setaceous, scabrous, shorter than the achene.

Upper Guinea. Borgu, *Barter! Baikie!*

10. **C. linearifolia,** *O. & H.* Erect nearly glabrous perennial herb, 4–5 feet high, from a woody stock, simple or nearly so. Leaves linear, undivided, denticulate-scabrous on the margins, acute at both ends, sessile, 2–6 by $\frac{1}{6}$–$\frac{1}{3}$ in. Capitula hemispherical, $\frac{3}{8}$–$\frac{1}{3}$ in. long, 1–3 together, on peduncles ranging up to 5 in., in a terminal cyme. Outer involucral bracts linear-lanceolate equalling the inner, glabrous except the hispid-scabrous base; inner glabrous, broader. Achenes (immature) linear-oblong, compressed, hispid on margins, not winged? Aristæ filiform, short.

Nile Land. Djur-land, Steppes near Agada, *Schweinfurth!*

11. **C. guineensis,** *O. & H.* Nearly glabrous annual, erect, 2 ft. high or more. Leaves tripartite bilobed or undivided, remotely denticulate; divisions (or the whole leaf) linear, narrowed at both ends, subsessile, 1–7 by $\frac{1}{15}$–$\frac{3}{8}$ in., margins subscabrous. Capitula campanulate-

hemispherical, $\frac{1}{2}$–$\frac{3}{4}$ in. long, on peduncles of 2–7 in., in a lax open trichotomous cyme or solitary and terminating the branches. Outer scales of the involucre glabrous, narrowly linear, shorter and narrower than the inner ones which are sometimes not quite glabrous, succeeded by a few similar bracts near the top of the peduncle. Ligules large. Achenes linear-oblong, compressed, about $\frac{1}{2}$ in. long, winged, setulose or nearly glabrous, ciliate on the wings. Aristæ erect, filiform, shorter than the achene, barbellate.

Upper Guinea. Niger, Nupe, *Barter! Dr. Baikie!* (cult.); Abbeokuta, *Dr. Irving!* (said to be cultivated).

12. **C. macrantha,** *Schultz Bip. in Walp. Rep.* vi. p. 163. Perennial, 1–3 ft. high, glabrous in most parts. Stems several from a woody stock, often rooting below, ascending. Leaves bipinnatisect, sessile or subsessile, ovate in outline, $\frac{2}{3}$–3 in. long, lobes linear ending in an acute callous point. Capitula hemispherical, $\frac{1}{4}$–$\frac{3}{4}$ in. long, on peduncles of 1–6 in. solitary or forming a lax open corymbose cyme. Outer involucral bracts linear 3-nerved green glabrous about equalling the oblong-lanceolate broader sometimes coloured inner ones, which are hispid-fimbriate on the mid-line of the back. Achenes winged, compressed, puberulous or pilose; wings in some cases very broad above, ciliate, $\frac{1}{3}$ in. long. Aristæ subulate, pectinate-ciliate, not quite as long as the achene.—*Prestinaria macrantha*, Schultz Bip. in Hb. Schimp. Abyss. ii. n. 1236; *Verbesina macrantha*, A. Rich. Fl. Abyss. i. p. 408; *? C. macroptera*, Schultz Bip. in Schweinf. Fl. Æthiop. 284. (We have seen achenes only in Hb. Schimp. ed. Buchinger No. 22, A.D. 1854.)

Nile Land. Abyssinia, *Schimper!*

13. **C. Prestinaria,** *Schultz Bip. in Walp. Rep.* vi. p. 163. Nearly glabrous annual, 8–24 in. high, branched from the base, somewhat glaucous. Leaves ovate or lanceolate in outline, bipinnatisect, $\frac{1}{2}$–2 in., subsessile, lobes linear or lanceolate, glabrous or somewhat ciliate, with an acute terminal callus. Capitula $\frac{1}{4}$–$\frac{1}{2}$ in. long, on slender pedicels of $\frac{1}{4}$–$2\frac{1}{2}$ in., in a lax open corymbose cyme. Involucral bracts glabrous, of nearly equal length, outer linear, 3-nerved; inner wider. Achenes linear-oblong, compressed, glabrous or hairy on the faces, winged, $\frac{1}{4}$ in. long; wings broader upwards, ciliate with long ascending hairs. Aristæ elongated, exceeding the tubular florets and longer than the achene, rather wider below, ciliate—*? C. setigera*, Schultz Bip. *l. c.*; *Prestiniaria bidentoides*, Schultz Bip. in Hb. Schimp. Abyss. i. n. 62; *Verbesina veris*, A. Rich. Fl. Abyss. i. p. 407; *V. lineata*, A. Rich. *l. c.* p. 410.

Nile Land. Abyssinia, *Schimper! Petit! Q. Dillon! Hildebrandt.*

14. **C. pachyloma,** *O. & H.* Puberulous erect or ascending herb, apparently annual, $1\frac{1}{2}$–2 ft. high or more. Leaves bipinnatipartite, ovate in outline, subsessile, $\frac{3}{4}$–2 in. long, lobes ovate or lanceolate, entire or cut, mostly acute. Capitula subglobose, $\frac{1}{3}$–$\frac{1}{2}$ in. long, on peduncles of 2–4 in., in a lax corymbose cyme. Outer involucral bracts linear, remotely ciliate otherwise nearly glabrous, about as long as the broader inner ones. Achenes turbinate-oblong, somewhat curved, not much

compressed, $\frac{1}{6}$—$\frac{1}{5}$ in. long, with 2 thick pale rounded setulose lateral ridges without wings. Aristæ broadly subulate from a broad base, shorter than or nearly equalling the achene, minutely ciliate.

Wlle Land. Abyssinia, *Schimper!*

UNKNOWN SPECIES OF COREOPSIS.

Coreopsis Borianiana, Schultz Bip. in Schweinf. et Aschers Enum. p. 284, name only, from Sennaar.

C. Buchingeri, Schultz Bip. *l. c.* name only, from Abyssinia.

C. callosa, Schultz Bip. *l. c.* name only, from Abyssinia.

C. involucrata, Schultz Bip. *l. c.* name only, from Abyssinia.

69. **BIDENS**, L.; Benth. et Hook. f. Gen. Pl. ii. p. 387.

Capitula heterogamous radiate; ray-florets ligulate 1-seriate ♀ or neuter, occasionally wanting and the capitula thus homogamous. Involucre sub-2-seriate, inserted around an often dilated receptacular disk, outer bracts often herbaceous, inner membranous. Scales of receptacle nearly plane or slightly concave. Anther-base entire or minutely sagittate. Style-branches with abrupt appendices. Achenes 4-angled or compressed, linear or oblong, often elongate and narrowed upwards, crowned with 2–4 retrorsely barbed aristæ.—Herbs with opposite pinnati- or ternati-sect or undivided leaves and solitary or loosely cymose pedunculate yellow or white conspicuous capitula.

A large genus of warm and temperate regions in both hemispheres.

With one or two exceptions the following species are peculiar to this Flora.

§ 1. PSILOCARPÆA. Achenes much narrowed upwards, quadrangular, tipped with usually 3 or 4 setæ.

Leaves pinnately lobed or undivided.

Glabrous or sparingly hairy . . . . . 1. *B. pilosa.*

Scabrid-pilose, especially above . . . . . 2. *B. quadriseta.*

Leaves bipinnately lobed . . . . . 3. *B. bipinnata.*

§ 2. PLATYCARPÆA. Achenes much compressed, striate, not much narrowed to the truncate apex, tipped with usually 2 setæ only.

Lobes of the leaves ovate oval or lanceolate . . . . . 4. *B. Schimperi.*

Lobes of the leaves narrowly linear . . . . . 5. *B. lineariloba.*

1. **B. pilosa,** *Linn. Sp. Pl.*, ed. i., p. 832. An erect annual, 3–60 in. high, glabrous or somewhat pilose. Stem and branches quadrangular. Leaves ovate, mostly pinnately lobed occasionally undivided, 1–8 in. long including the petiole, which ranges up to $2\frac{1}{2}$ in., membranous; lobes 1–5, opposite with a terminal one, ovate or lanceolate, acuminate, shortly stalked, serrate or incisely toothed, ranging up to $3\frac{1}{2}$ by 2 in. Capitula hemispherical $\frac{1}{4}$—$\frac{1}{2}$ in. diameter in flower, elongating and widening upwards in fruit, on peduncles or pedicels of $\frac{1}{2}$—6 in., in a lax open corymbose cyme. Involucral bracts linear, glabrous ciliate or pubescent, acute or subobtuse, $\frac{1}{6}$—$\frac{1}{3}$ in. long, lax and spreading in fruit. Disk-florets yellow. Ligule of the ray-florets white, sometimes wanting. Achenes slender elongated and gradually tapering towards the apex, glabrous setulose or minutely tubercled, those of the disk $\frac{1}{4}$—$\frac{3}{4}$ in. long, the outer ones shorter, not or scarcely

compressed, obtusely quadrangular, tipped with 4–2 spreading retrorsely barbed strong setæ. Receptacle shortly alveolate.—DC. Prodr. v. p. 597, with synonymy; Benth. Fl. Hongk. p. 183, with synonymy; *B. leucantha*, Willd. Sp. Pl. iii. p. 1719; DC. l.c. 598, with synonymy; *B. abortiva*, Schum. et Thonn. Pl. Guin. p. 381; *B.* (Psilocarpæa) *abyssinica*, Schultz Bip. in Walp. Rep. vi. p. 167.

Upper Guinea. *Thonning;* Accra and Sierra Leone, *T. Vogel! Afzelius!* Fernando Po, *Mann!* Gaboon, *Jardin.*

Nile Land. Abyssinia, *Roth! Schimper! Quartin Dillon, Petit, Hildebrandt* 415 (*B. abyssinicus*) fide Vatke; Æthiopia, *Kotschy!* Gallabat, *Schweinfurth!* Bongo-land, *Schweinfurth!* Djur-land, *Schweinfurth!* Karague, *Speke and Grant!* Soturba, *Schweinfurth!*

Lower Guinea. Congo, *Burton!* Angola, *Monteiro!*

Mozamb. Distr. *Zanzibar* Island, *Hildebrandt!* Mozambique, *Peters!*

A common weed, probably of American origin, widely spread over most hot countries.

2. **B. quadriseta,** *Hochst. in Hb. Schimp. Abyss.* n. 2181 (1854). An erect annual, 1–2 ft. high, scabrid-pilose especially on the upper parts. Branches tetragonal. Leaves pinnately lobed, ovate in outline, 1½–4 in. long, including the petiole which ranges up to 1½ in.; lobes ovate or lanceolate, 1–2 by ¼–1¼ in., acute or acuminate, serrate, sometimes incisely so. Capitula the size of *B. pilosa*, and similarly arranged. Involucral bracts densely pilose-pubescent, ¼–⅔ in. long, linear, acute. Florets unknown. Achenes like those of *B. pilosa*, ranging up to nearly 1 in., tipped by 4–3 setæ.—*B. abyssinica*, Schultz Bip. var. *quadriaristata*, Hochst. ex Schweinf. Beitr. Fl. Æthiop. p. 142; var. *incisifolia*, Hochst. l.c., n. 2324, has rather more deeply cut leaf-lobes; alt. 4000 ft.

Nile Land. Abyssinia, *Schimper!* alt. 1–7000 ft.

This species may prove to be merely a more hairy state of *B. pilosa*, as indeed it has been considered by Schweinfurth.

3. **B. bipinnata,** *Linn. Sp. Pl.*, ed. i., p. 832. An erect glabrous or subglabrous annual of a few feet. Branches quadrangular. Leaves mostly bipinnately lobed, ovate in outline, 1½–4 in. long or more; lobes ovate or oval or the terminal one lanceolate, incise-serrate, ranging up to 2 by 1¼ in. Capitula ¼–⅓ in. diameter in flower, elongated and thicker upwards in fruit. Outer involucral bracts narrowly linear, glabrous or ciliate, ⅕–¼ in. long; inner broader, lanceolate, glabrous, coloured, rather exceeding the outer. Ligule of the ray-florets yellow or turning white according to Schultz. Achenes slender elongated and gradually tapering towards the apex, glabrous, those of the disk about ½–⅔ in. long, tipped by 4–3 spreading retrorsely barbed setæ.—*B. Kotschyi*, Schultz Bip. in Walp. Rep. vi. p. 168.

Upper Guinea. Sierra Leone, *G. Don!* Senegambia.

Nile Land. Cordofan, *Kotschy!*

A common weed of hot countries.

4. **B. Schimperi,** *Schultz Bip. in Walp. Rep.* vi. p. 168. A subscabrous-puberulous annual, from 9 in. to several feet high. Branches quadrangular. Leaves 2–3-pinnatisect or tripartite with deeply trifid

segments or simply trifid, ovate in outline, upper ones mostly 3–6 in. long including the petiole of $\frac{1}{6}$–$\frac{2}{3}$ in.; lobes oval or the terminal one lanceolate, incise-dentate, mostly obtuse with an apiculate callus at the apex, usually scattered with blackish dots. Capitula $\frac{3}{8}$–$\frac{1}{2}$ in. diameter in flower, lengthening in fruit and widening upwards, on peduncles or pedicels of $1\frac{1}{2}$–6 in., in a lax open corymbose cyme. Outer involucral bracts linear-spathulate, obtuse, pilose, $\frac{1}{4}$–$\frac{5}{8}$ in. long, exceeding the inner oblong coloured ones. Ligule of the ray-florets yellow, $\frac{1}{2}$ in. long. Achenes much compressed, striate, somewhat narrowed at the truncate apex, $\frac{1}{4}$–$\frac{1}{2}$ in. long, with 2 or according to Schultz sometimes 3 suberect or spreading retrorsely barbed rigid setæ, often tuberculate.—*B. Buchingeri*, Schultz Bip. ex Schweinf. Beitr. Fl. Æthiop. p. 142.

Wile Land. Abyssinia, *Schimper!* alt. 5–6000 ft.; Suakin to Hor Tamanib, Red Sea, *Lord!*

Mozamb. Distr. Rios de Sena, *Peters!* Lupata, *Kirk!*

5. **B. lineariloba,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 99, t. 60. An erect glabrous herb, $1\frac{1}{2}$–$2\frac{1}{2}$ ft. high, simple up to the branches of the inflorescence. Stem sulcate. Leaves bipinnatipartite, $1\frac{3}{4}$–$4\frac{1}{2}$ in. long, segments narrowly linear, some 1 in. long; petioles short, dilated, amplexicaul, somewhat ciliate. Capitula exclusive of the rays nearly 1 in. diameter, inclusive 2 in., solitary on terminal peduncle $4\frac{1}{2}$ in. long and on shorter pedicels, forming small cymes terminating the lateral branches. Outer involucral bracts about 10, very narrowly lanceolate, attenuate, more or less hispid-ciliate, lax, $\frac{3}{8}$ in. long, rather longer than the broader coloured alternating glabrous inner ones. Ligule of the ray-florets elliptic-obovate, yellow. Ovary compressed, glabrous, indistinctly striate, truncate at apex, tipped with 2 erect retrorsely barbed setæ. Fruit not seen.—*Verbesina*, n. 1, T. Thoms. in Speke Journ., App. p. 638.

Wile Land. 4° 18′ S. Lat., at Mininga, by cornfields, *Speke and Grant!*

Bidens laciniata, Schultz Bip. in Schweinf. et Aschers. Enum. p. 283, from Sennaar, name only, is unknown to us.

70. CHRYSANTHELLUM, Rich.; Benth. et Hook. f. Gen. Pl. ii. p. 389.

Capitula heterogamous radiate; ray-florets ligulate usually small ♀. Involucre campanulate or hemispherical, bracts 1–2-seriate, subequal, ovate or ovate-lanceolate, somewhat membranous. Scales of receptacle oblong or linear obtuse plane persistent. Anther-base 2-dentate. Style-branches subulate and papillose or setulose nearly from the base. Achenes oblong compressed, with a thick paler margin; pappus 0, or reduced to a minute epigynous disk.—Herbs, with alternate multifid leaves and small loosely cymose pedunculate capitula.

A wide-spread genus of two or three species.

1. **C. procumbens,** *Pers. Syn. Pl.* ii. p. 471. Glabrous annual, procumbent or erect, usually much branched, ranging up to a foot in height. Leaves alternate, petiolate, decompound-pinnatipartite, ranging up to 1½ in. besides the subamplexicaul petiole which ranges nearly up to the same length, segments linear or lanceolate, apiculate. Capitula ⅛–⅓ in. diameter, on pedicels ranging up to 1¾ in., numerous, cymose.—DC. Prodr. v. p. 630, with synonymy; *C. Swartzii*, *C. senegalense*, and *C. indicum*, DC., l.c., p. 631 with their synonymy. *Hinterhubera Kotschyi*, Schultz Bip. in Hb. Kotsch. Nub. n. 175, and in Hb. Schimp. Abyss. ii. n. 1183, iii. n. 1630.

Upper Guinea. Senegambia, *Perrottet;* Quorra at Patteh, *T. Vogel!* Niger at Nupe, *Barter! Baikie!* Dahomey, *Burton!* Cape Coast, *Tedlie.*

Nile Land. Gallabat, *Schweinfurth!* White Nile, *Petherick! Binder.* Cordofan, *Kotschy!* Abyssinia, *Schimper! Hildebrandt*; Unyoro, *Speke and Grant!* Djur-land, *Schweinfurth!*

A common weed extending from East India to the West Indies and Brazil.

Chrysanthellum abyssinicum, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 284, name only, from Abyssinia, is unknown to us.

71. JAUMEA, Pers.; Benth. et Hook. f. Gen. Pl. ii. 397; (*Hypericophyllum*, Steetz, Benth. et Hook. f. l.c.)

Capitula heterogamous (or radiate); florets tubular. Involucre campanulate or turbinate; bracts pauciseriate rather broad submembranous imbricate, outer shorter. Receptacle naked. Anther-base obtuse. Style-branches obtuse or truncate. Achenes oblong or cuneate, angled; pappus of numerous narrow or aristiform paleæ, apex minutely uncinate (in our species).—Herbs or undershrubs with opposite linear or oblong-lanceolate entire leaves and solitary terminal long-pedunculate capitula of medium size.

A small American genus. We follow the "Genera Plantarum" in referring our plant to this genus. Our material for comparison is very imperfect, but the only African species has a near general resemblance to *Jaumea* (*Chæthymenia*) *peduncularis*, (H. et A.)

1. **J. compositarum,** *Benth. et Hook. f. Gen. Pl.* ii. p. 397. An erect glabrous herb, 2 ft. or more high, simple below, once trichotomously branched above. Leaves lanceolate-oblong, obtuse or scarcely acute, sessile, semi-amplexicaul, 1¼–5 by ⅓–1½ in., closely pellucid-punctate; margins minutely scabrid-ciliate. Capitula ½–1 in. diameter, homogamous; peduncles 3 together, bibracteate about the middle, 3½–7½ in. Involucral bracts obtuse, glaucescent; inner lanceolate, ½ in. long; outer oval, ¼ in. long. Florets ⅗–¾ in. long, corolla saffron-coloured. Aristæ of the pappus 18–20, free, attenuate from the sparsely setulose base, glabrous and mostly hooked at the apex, unequal, the longer about as long as the achenes.—*Hypericophyllum compositarum*, Steetz in Peters Mossamb. Bot. p. 499, t. 50.

Mozamb. Distr. Boror, Rios de Sena, *Peters.* Zanzibar, *Burton!*

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72. *Tagetes erecta*, Linn., a South American plant, occurs in Abyssinia and other parts of Tropical Africa.

73. **ANTHEMIS,** L.; Benth. et Hook. f. Gen. Pl. ii. 420.

Capitula heterogamous radiate, ray-florets 1-seriate, ligulate, conspicuous, white or yellow, ♀ or neuter. Involucre hemispherical; bracts pluriseriate closely imbricate with scarious margins, outer successively shorter. Receptacle paleaceous convex or conical. Anther-base entire. Style-branches truncate, penicillate. Achenes oblong, apex obtuse; pappus 0 or coroniform or unilateral.—Herbs with alternate toothed or pinnatisect leaves often with narrow segments and terminal pedunculate often rather large capitula.

A considerable genus, chiefly European and Mediterranean.

Leaves tripinnatisect. Plant ranging up to 2½ ft. . . . . 1. *A. Cotula.*
Leaves bipinnatisect. Plant dwarf, 1–2 in. . . . . 2. *A. pygmæa.*

1. **A. Cotula,** *Linn. Sp. Pl.* ed. i. p. 894. A somewhat leafy but inconspicuously hairy herb, usually decumbent, branched, ranging up to 2½ ft. high or more. Leaves tripinnatisect, ovate, 1–3 in. long; segments narrowly linear, acute or with a terminal callus. Capitula ¼–½ in. diameter exclusive of the rays, terminal, solitary, pedunculate. Involucral bracts oblong, hairy, with a green midrib and usually dark brown and crisped margin. Ligules of the usually neuter ray-florets white, ¼–½ in. long. Scales of the receptacle narrowly lanceolate, nearly equalling the florets, tips setaceous brown.—*A. abyssinica,* J. Gay in Hb. Schimp. Abyss. ii. n. 539; Schultz Bip. in Hb. Schimp. Abyss. ann. 1850, n. 94, et in Schweinf. Beitr. Fl. Æthiop. p. 142 (name only); *A. tigrensis,* J. Gay, l.c., iii. n. 1848.

Nile Land. Abyssinia, *Schimper! Parkyns! Roth!*

These forms differ from the type by dark margins of the involucral bracts and tips of the scales of the receptacle. *A. tigrensis* is in general smaller, more hairy, and has the leaf-lobes shorter than in *A. abyssinica.*

2. **A. pygmæa,** *Schultz Bip. in Hb. Schimp. Abyss.* A.D. 1850, n. 220; *Schweinf. Fl. Æthiop.* 142, n. 726 (*sine descriptione*). A dwarf glabrous perennial herb, 1–2 in. high. Rootstock thick, branched. Leaves narrowly oblanceolate, pinnatipartite, petiolate, ⅓–1⅝ in. long; pinnæ subpalmatisect, ⅛ in. or less, the lower ones remote; pinnules linear. Capitula hemispherical, inclusive of the rays ½–1 in. diameter, solitary, terminal, shortly pedunculate. Involucral bracts oblong, obtuse, thinly pubescent; margins dark brown. Scales of the receptacle narrowly linear, acute, nearly equalling the florets; tip brown. Ligule of the neuter florets oblong, obtuse, ⅛ in. long.

Nile Land. Abyssinia, *Schimper.*

74. **MATRICARIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 427.

Capitula heterogamous, radiate; ray-florets in few rows, female, fertile or barren, ligulate; disk-florets in many rows, hermaphrodite, fertile, tubular. Involucre depresso-hemispherical; bracts in a few rows, imbricated. Receptacle convex, naked, areolate. Corolla of the disk-florets pentamerous. Anthers obtuse and entire at the base,

ecaudate, apiculate at the apex. Style-branches compressed, rounded (not appendaged in our species). Achenes shortly oblong, somewhat compressed (4-ribbed and alike on both faces in our species); apex obtuse; pappus (in our species) rudimentary, of about 8 little teeth about the annular apex of the achene.—Herbs with alternate pinnatifid leaves, terminal pedunculate capitula of moderate size, white ray-florets and yellow disk-florets.

A genus of several species, widely spread.

1. **M. (?) hispida,** *Vatke in Oesterr. Bot. Zeitschr.* xxvii. p. 194 (1877). A hispid-pubescent herb, rather woody at the base, much-branched, somewhat more than a foot high. Leaves alternate, oblong, chartaceous, pinnatifid-toothed, sessile, ranging up to $1\frac{1}{4}$ in. long; the upper ones smaller. Capitula hemispherical, $\frac{1}{4}$ in. diameter, pedunculate, solitary, terminating the branches. Involucral bracts oblong, rather narrowed at both ends, the outer ones especially hirsute, about $\frac{1}{8}$ in. long. Ligules narrow, reflexed, bidentate at the tip, $\frac{1}{6}$ in. long.

Mozamb. Distr. Rios de Sena, *Peters!*

75. COTULA, L.; Benth. et Hook. f. Gen. Pl. ii. 428.

Capitula heterogamous, discoid; outer florets ♀, 1–∞-seriate or wanting. Involucre hemispherical; bracts 1–2-seriate, slightly unequal, more or less oblong and obtuse, with scarious margins. Receptacle naked, plane or convex. Corolla of outer ♀ florets minute or 0. Anther-base obtuse. Style-branches truncate or obtuse. Achenes more or less dorsally compressed; pappus 0 or obliquely coroniform.—Low herbs with alternate or opposite usually pinnatisect leaves and small yellow pedunculate capitula.

A large widely diffused weed-like genus.

Female florets numerous, in many rows	1. *C. anthemoides.*
Female florets few, in 1–2 rows or altogether wanting.	
Leaves alternate.	
Lobes of hoary leaves oblong. Female florets few or wanting.	
Achenes without a ring of hairs at top	2. *C. cinerea.*
Achenes with a ring of hairs at top	3. *C. Kotschyi.*
Lobes of pilose not hoary leaves narrowly linear. Female florets in 1–2 rows	4. *C. abyssinica.*
Leaves opposite	5. *C. cryptocephala.*

1. **C. anthemoides,** *Linn. Sp. Pl.* edit. i. 891. Usually hirsute or pubescent, much-branched, annual; branches spreading or prostrate, ranging up to 9 in. long. Leaves alternate, deeply sub-bipinnatifid, obovate in outline, $\frac{1}{3}$–$\frac{3}{4}$ in. long, half-clasping at base, lobes lanceolate or ovate, apiculate. Capitula $\frac{1}{8}$–$\frac{1}{5}$ in. diameter, solitary, terminal; peduncles not exceeding the leaves. Female florets numerous, in many rows. Involucral bracts obtuse, bordered with scarious margins. Achenes bordered with narrow wing. Receptacle nearly flat, finely tubercled. Pappus 0.—DC. Prodr. vi. 78. Harv. Fl. Cap. iii. p. 182, with synonymy except that of Schimper i. n. 137. *C. dichrocephala,*

Schultz Bip. in Hb. Schimp. Abyss. ii. n. 1325; A. Rich. Fl. Abyss. i. p. 419. *Pleiogyne anthemodes*, C. Koch in Bot. Zeit. i. p. 40 (1843).

Upper Guinea. Senegambia, *Perrottet* (nearly glabrous).

Nile Land. Abyssinia, *Schimper!* Sennaar, *Kotschy!* Upper Egypt, *Bromfield! Schweinfurth! Ehrenberg.*

South Central? Without precise locality, *Baines!* (nearly glabrous, shining.)

Extends to Egypt and, according to some authors, to the Cape of Good Hope and N.W. India, etc.

2. **C. cinerea,** *Delile Fl. Ægypte*, p. 131, t. 47, f. 4. Densely villous pale green herb, sometimes suffruticose at the base, 1–6 in. high. Leaves pinnatifid, alternate, obovate or spathulate in outline, narrow below, $\frac{1}{4}$–$\frac{3}{4}$ in. long; lobes oblong, obtuse. Capitula $\frac{1}{4}$–$\frac{1}{3}$ in. diameter, pedunculate, terminal; peduncles $\frac{1}{2}$–1 in. long, exceeding the leaves. Involucral bracts linear. Female florets few or usually wanting. Achenes not winged. Pappus 0. Receptacle convex, nearly naked.—*Brocchia cinerea*, Vis. Pl. Ægypt. et Nub. p. 35. *Tanacetum cinereum*, DC. Prodr. vi. p. 131. *Cenocline cinerea*, C. Koch in Bot. Zeit. i. p. 41 (1843). *Grangea cinerea*, Link Enum. Pl. ii. p. 344. *Cotula minor*, Caruel Pl. Eg. exs. ex Boiss. Fl. Orient. iii. p. 358.

Nile Land. Cordofan, *Kotschy!*

Extends to Egypt.

Klatt in Ann. Sc. Nat. ser. v. vol. xviii. p. 372, mentions a specimen collected by Leprieur at Dagana in Senegambia as belonging to this species.

3. **C. Kotschyi,** *Benth. et Hook. f. Gen. Pl.* ii. p. 429. Hoary-pilose, suffruticose below, 1–12 in. high, much-branched from the crown of the root. Leaves alternate, obovate, pinnatipartite, $\frac{1}{4}$–$\frac{3}{4}$ in. long; lobes oblong, obtuse, sometimes toothed. Capitula $\frac{1}{6}$–$\frac{1}{4}$ in. diameter, pedunculate, terminal; peduncles $\frac{1}{4}$–1 in. long, usually exceeding the leaves. Female florets few. Achenes obovoid, minutely hairy above, crowned with a ring of filiform setæ, somewhat compressed, obscurely 4-sided. Receptacle hemispherical.—*Brocchia Kotschyi*, Schultz Bip. in Schweinf. et Aschers. Enum. p. 283 (name only).

Nile Land. Sennaar, *Kotschy!* White Nile, *Schweinfurth!*

4. **C. abyssinica,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 137. A pilose annual, usually much-branched near the base, ranging up to a foot high. Branches ascending, procumbent at base. Leaves alternate, bipinnatipartite, ranging up to $1\frac{1}{4}$ in. including the petiole; lobes linear acute. Petioles half-clasping or shortly sheathing, short or nearly as long as the lamina of the leaves. Capitula ranging up to $\frac{3}{8}$ in. diameter; peduncles to 6 in. Involucral bracts oblong, obtuse, with scarious margins, nearly or quite glabrous. Female florets in one row. Achenes oblong, somewhat compressed, concavo-convex, those of the ray narrowly winged; pappus 0. Receptacle convex, tuberculate.—A. Rich. Fl. Abyss. i. p. 419.

Nile Land. Abyssinia, *Schimper!* 4–14,000 ft. alt., *Roth!* Upper Nile, *Speke and Grant!*

This is probably the same species as the Cape dwarf *C. pusilla*, Thunb. Prodr. Pl.

Cap., pars post., p. 162 (1800), which is represented in our Flora by some specimens ⅓–¾ in. high, with shortly sheathing petioles and shortly pedunculate heads; Abyssinia, *Schimper!* A.D. 1850, n. 125 in Hb. Berol.; alt. 14,000 ft.

5. **C. cryptocephala,** *Schultz Bip. in Hb. Schimp. Abyss.* ii. n. 1171. Procumbent herb, often rooting by layers, glabrous except the top of the peduncles, 1–6 in. high. Leaves opposite, bipinnatipartite, 1–4½ in. long including the sheathing connate petiole, oval in outline, lobes shortly linear, acute. Capitula ⅓ in. diameter, shortly pedunculate, overtopped by the leaves; peduncles ¼–1 in. long, pilose-pubescent above. Involucral bracts oval, obtuse, glabrous, margin membranous, dark brown towards the apex. Female florets in one row. Achenes compressed, glabrous, ½ in. long, obovate-oblong, emarginate at apex. Receptacle flat? Pappus 0.—A. Rich. Fl. Abyss. i. p. 420.

Nile Land. Abyssinia, *Schimper!*

76. SCHISTOSTEPHIUM, Less.; Benth. et Hook. f. Gen. Pl. ii. 432.

Capitula heterogamous, discoid; outer florets ♀ with a tubular or oblique rudimentary simple or 2-fid corolla. Involucre hemispherical or turbinate; bracts oval or lanceolate, imbricate, pluriseriate. Receptacle naked or nearly so. Anther-base obtuse. Style-branches truncate. Achenes more or ess obovoid, somewhat angled, glabrous; pappus 0.—Erect or decumbent leafy-stemmed herbs with alternate pinnatifid incised or crenate-lobate leaves and terminal corymbose cymes of yellow capitula.

Confined to Tropical and Southern Africa.

Florets all hermaphrodite or the outermost very few female.
Leaves pinnatisect, alternate . . . . . 1. *S. heptalobum.*
Outer florets female. Leaves coarsely toothed, those of the short sterile branches opposite . . . . . 2. *S. rotundifolium.*

1. **S. heptalobum,** *Benth. et Hook. f. Gen. Pl.* ii. p. 432. Branches herbaceous, subterete or somewhat angular below the nodes, obsoletely pubescent. Upper leaves sessile or sometimes subpetiolate, obovate in general outline, alternate, pinnatisect, appressedly pubescent, ½–1½ in. long, with about 2 pairs of lobes and a longer terminal one; lobes mostly oblong, apiculate, entire, or the terminal one with a lateral lobule, margins revolute. Capitula hemispherical or turbinate, ⅛–¼ in. diameter, on pedicels not exceeding ⅓ in., in dense pedunculate corymbose cymes. Involucral bracts narrowly lanceolate, appressedly silky, mostly obtuse. Florets all hermaphrodite or very few of the outermost ones perhaps female. Pappus 0.

Mozamb. Distr. Zambesia, near Senna, *Kirk!*
Occurs also in Natal.

2. **S. rotundifolium,** *Fenzl ex Harv. Fl. Cap.* iii. p. 169. A robust slightly pubescent herb, 2–3 ft. high. Branches alternate, terete below, obtusely angular above. Leaves roundishly ovate in general outline, incise-dentate, ½–1½ in. long besides petiole of ⅛–½ in., 3–7-

nerved, truncate or broadly wedge-shaped at base, alternate but those of the shortened sterile branches opposite. Capitula hemispherical, about $\frac{1}{8}$ in. diameter, on slender pedicels ranging up to $\frac{3}{8}$ in., in a rather dense hemispherical or ovoid cyme. Involucral bracts narrowly oblong-lancolate, mostly acute, falling rather short of the florets. Marginal florets female. Pappus 0.

South Central. Not yet recorded from Tropical Africa; but there is a specimen in the Kew herbarium from New Caledonia, Drakensbergen, about 23½° S. Lat., collected by (Bolus n. 3007) *McLea!*

Occurs also in Kafirland and Natal.

77. **ARTEMISIA,** L.; Benth. et Hook. f. Gen. Pl. ii. 435.

Capitula heterogamous, discoid; outer florets pistillate, tubular. Involucre ovoid or campanulate, bracts pauciseriate, subequal, imbricate. Receptacle naked or nearly so. Anther-base entire or 2-dentate. Style-branches truncate or penicillate. Achenes narrowly ellipsoidal in our species; pappus 0.—Herbs or shrubs with 2–3-pinnatisect (simply incised or entire) alternate leaves and small often pendulous capitula in racemose panicles (in *A. abyssinica*).

A large genus chiefly confined to the Northern hemisphere.

1. **A. abyssinica,** *Schultz Bip. in Hb. Schimp. Abyss.* iii. n. 1862. Branches two or more from the crown of the root, herbaceous above, erect, simple or nearly so, 1–2½ ft. high, glabrate or somewhat pubescent. Leaves decompound in capillary divisions, ovate or oval in general outline, $\frac{1}{3}$–2 in. long besides the petiole which is short in the case of the upper and elongated in the lower leaves, glabrate or somewhat hoary-hairy. Capitula subglobose, $\frac{1}{12}$–$\frac{1}{8}$ in. diameter, shortly pedicellate, in short racemes with a leaf at base often about equalling them, arranged in an elongated thyrsoid cyme. Involucral bracts oval obtuse nearly glabrate or somewhat pubescent. Marginal florets female, central ones hermaphrodite, fertile. Achenes obscurely striate, without pappus. Receptacle convex, naked.—A. Rich. Fl. Abyss. i. p. 420.

Nilé Land. Abyssinia, *Schimper! Q. Dillon and Petit!*

Schweinfurth in Beitr. Fl. Æthiop. p. 142, gives a variety *eriocephala* of Schultz Bip. with more cottony heads; also a species *A. Schimperi*, Schultz Bip. from Abyssinia without description.

There are in the Kew Herbarium specimens in leaf without flowers from Kilimanjaro, collected by Dr. Kirk and Rev. C. New, and also from Tropical South Africa, collected by T. Baines, all of which resemble *Artemisia Afra*, Jacq.

78. **GONGROTHAMNUS,** Steetz; Benth. et Hook. f. Gen. Pl. ii. 437.

Capitula homogamous, discoid; florets ☿. Involucre campanulate or turbinate, scales pluriseriate lanceolate acute, outer shorter. Receptacle toothed or shortly fimbrillate. Corolla regular, glabrous or sessile-glandular. Anther-base with obtuse auricles. Style-branches narrow, linear, papillose. Achene probably 10-costate, hairy; pappus

setaceous, tawny or nearly white, outer setæ short.—Scrambling or erect shrubs with alternate ovate triplinerved leaves and terminal corymbs of orange or yellow capitula.

Peculiar to S.E. Tropical Africa.

Heads about 22–25-flowered . . . . . 1. *G. divaricatus.*
Heads about 11–12-flowered.
  Leaves acute. Pappus tawny . . . . . 2. *G. solidaginifolius.*
  Leaves obtuse. Pappus nearly white . . . . . 3. *G. Hildebrandtii.*

1. **G. divaricatus,** *Steetz in Peters Reise Mossamb. Bot.* p. 342. Glabrate, climbing, shrubby; stems several ft. in length, terete, striate; branchlets divaricate. Leaves ovate or ovate-lanceolate, acutely acuminate, obliquely or suddenly cuneate at the base, dark above, whitish beneath with an obsolete tomentum, repand or irregularly dentate, 1–3 by $\frac{1}{2}$–$1\frac{1}{2}$ in., besides petiole of $\frac{1}{6}$–$\frac{1}{2}$ in. Capitula campanulate, 22–25-flowered, $\frac{1}{3}$–$\frac{1}{2}$ in. long, on slender bracteolate pedicels of $\frac{1}{6}$–$\frac{1}{2}$ in., in a divaricately branched dense cyme of 3–6 in. diam. Involucral bracts linear-lanceolate, acute. Corolla yellow or bright orange.

Mozamb. Distr. Inhambane, *Peters!* Lower Valley of River Shire, *Kirk! Meller!*

2. **G. solidaginifolius,** *O. & H.* A shrub, 8–10 ft. high. Branches erect angular and pubescent-scabrid at the apex. Leaves subsessile, lanceolate, acute, serrate, glabrous above, glaucous and along the nerves pubescent beneath, the upper ones $1\frac{1}{2}$ by $\frac{1}{3}$–$\frac{5}{12}$ in. Cyme corymbose; pedicels very bracteolate; florets yellow. Outer involucral scales short, almost subulate, inner ones broadly linear, acute. Capitula about 12-flowered. Achenes nearly terete, striate, closely puberulous. Pappus of a pale cinnamon colour, outer row setose, short.—*Vernonia solidaginifolia,* Bojer ex DC. Prodr. v. p. 30.

Mozamb. Distr. Zanzibar Island, *Bojer.*

3. **G. Hildebrandtii,** *O. & H.* A puberulous shrub, with terete striate branches. Leaves petiolate, ovate or oval, repand-crenate, obtuse, narrowed towards the biauriculate base, 1–$1\frac{3}{4}$ in. long by $\frac{3}{8}$–$\frac{3}{4}$ in. wide; auricles $\frac{1}{8}$–$\frac{1}{6}$ in. long, oblong, arching downwards from a patent base; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. Capitula campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, on short slender pedicels, in moderately dense corymbose cymes. Involucral bracts lanceolate or the inner ones oblong, obtuse or the outer ones subacute, apiculate. Florets about 11 in a head. Achenes obovoid, setulose and sessile-glandular, unequally 6–7-costate. Pappus nearly white.—*Vernonia* (Lepidaploa) *Hildebrandtii,* Vatke in Oesterr. Bot. Zeitschr. 1875, p. 323.

Mozamb. Distr. Zanzibar Island, *Hildebrandt!*

The colour of the corollas is unknown but the involucre style-branches and pappus are quite those of *Gongrothamnus.*

79. **GYNURA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 445.

Capitula homogamous discoid; florets all tubular ☿ or some of the outer with imperfect anthers. Involucre at first cylindrical or

campanulate; bracts 1-seriate narrow equal with a few outer smaller. Receptacle foveolate or minutely fimbrillate. Anther-base entire or bidentate. Style-branches slender with subulate appendices. Achenes terete striate; pappus of copious white fine setæ.—Herbs with alternate pinnatifid-lyrate dentate or entire leaves and yellow orange-red or violet terminal medium-sized capitula, either solitary or more or less corymbose.

A genus of the Old World, differing from discoid species of *Senecio* in the longer subulate appendix of the style-branches.

Heads always solitary.
- Corollas purple, falling short of the pappus. Upper leaves sessile . . . . . 1. *G. cernua.*

Corollas yellow, equalling or exceeding the pappus.
- Leaves mostly petiolate . . . . . 2. *G. vitellina.*

Heads in corymbose cymes (very rarely solitary).
- Leaves mostly lyrate or pinnatifid, the lower ones petiolate.
  - Margins of the leaves acutely dentate . . . . . 3. *G. crepidioides.*
  - Margins of the leaves repand . . . . . 4. *G. miniata.*
- Leaves sessile, amplexicaul, not pinnatifid . . . . . 5. *G. amplexicaulis.*

1. **G. cernua,** *Benth. in Hook. Nig. Fl.* p. 437, *excl. syn. part.* Erect branched puberulous annual, about 2–3 ft. high. Leaves irregularly dentate or lobed, 1–4 in. long; the upper ones sessile ovate or oblong or laciniate-lyrate, auriculate-amplexicaul at the base; the lower ones petiolate. Capitula solitary, terminal, ½–¾ in. long, oblong soon becoming hemispherical; peduncles mostly 6–12 in. long, bearing a few linear or subulate bracts. Involucral bracts linear subulate glabrous. Disk with filiform bracts below, somewhat hairy. Corollas slender shorter than the pappus, teeth minute scarcely spreading, purple. Anthers included.—*Senecio cernuus,* Linn. fil. Suppl. Pl. p. 370 (1781); *Crassocephalum cernuum,* Mœnch. Meth. Pl. p. 516 (1794); *Cremocephalum* (sp.) Cass. Dict. xxxiv. p. 391 (1825); *Cacalia uniflora,* Schum. & Thonn. Beskr. p. 382 (1827); *Senecio rubens,* Jacq. Hort. Vindob. iii. p. 50, t. 98 (1777).

Upper Guinea. Guinea, *Thonning!* Niger, *Vogel! Barter!*

Nile Land. Sennaar, *Cienkowsky*; Abyssinia, *Schimper!* 6–7,000 ft. alt.; Djurland, *Schweinfurth!*

Mozamb. Distr. Manganja Hills, *Meller!*

Extends to the Comoro and other African Islands.

2. **G. vitellina,** *Benth. in Hook. Niger Fl.* p. 438. Subglabrous or puberulous somewhat shining herb, 2–6 ft. high, ascending from a procumbent base, with patent branches, sometimes subscandent. Leaves ovate or lanceolate, mostly petiolate, irregularly dentate, sometimes indistinctly lobed, broad near the base, 1–4 in. long, besides the petiole of ⅛–1½ in. which has stipuliform auricles at base. Capitula ⅜–⅝ in. long, erect or somewhat drooping, subhemispherical, solitary, terminal, on peduncles of 4–12 in., which bear about 2 or 3 narrow bracts. Involucral bracts linear-subulate, more or less hairy. Disk hairy with filiform bracts below. Corollas wider upwards, yellow,

equalling or exceeding the pappus.—*G. aurantiaca*, Benth. *l. c.* p. 437 ; *Senecio vitellinus*, Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 286.

Upper Guinea. Fernando Po, *Vogel ! Mann !* alt. 8,500 ft., *Barter !* Cameroons Mountains, *Mann !* alt. 7,000 ft.

North Central. Monbuttu-land, *Schweinfurth !*

Nile Land. Abyssinia, *Roth !*

3. **G. crepidioides,** *Benth. in Hook Niger Fl.* p. 438. Erect puberulous or glabrous simple or somewhat branched annual, 2–3 ft. high. Leaves deeply lyrate-pinnatifid, sometimes not lobed, mostly petiolate, 1–10 in. long; lobes acutely dentate. Capitula oblong, $\frac{1}{3}$–$\frac{1}{2}$ in. long, on slender pedicels of $\frac{1}{6}$–$2\frac{1}{2}$ in., in a dense or lax corymbose cyme, rarely solitary. Disk hairy, with filiform bracts below. Involucral bracts linear-subulate, nearly or quite glabrous. Corollas yellow or with purple-tips, shorter than or nearly equalling the pappus. —*G. polycephala*, Benth. *l. c.* p. 437 ; *G. diversifolia*, Schultz Bip. ex Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 156 ; *Senecio diversifolius*, A. Rich. Fl. Abyss. i. p. 437, non Dumort. nec Wall. ; *S. crepidioides*, Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 155 ; *G. microcephala*, Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 328.

Upper Guinea. Fernando Po, *Mann ! Vogel !* Senegambia, *Heudelot !* Sierra Leone, *Afzelius ! G. Don !* Niger, *Barter !*

North Central. Monbuttuland, *Schweinfurth !*

Nile Land. Abyssinia, *Q. Dillon ! Parkyns !* Bogos-land, *Steudner !*

Mozamb. Distr. Zambesi-land, Expedition Island, *Kirk !* Zanzibar, *Hildebrandt !*

Occurs also at Johanna.

4. **G. miniata,** *Welw. Apont.* p. 586 (1859). A somewhat pubescent erect herb, with the habit of *Emilia sonchifolia*, 2–4 ft. high. Root tuberous. Stem somewhat branched. Leaves lyrate or deeply pinnatifid, 3–6 in. long, musk-scented, margins repand, leaf-base (or petiole) often auriculate. Capitula $\frac{1}{2}$ in. long, on rather slender pedicels which range up to $1\frac{1}{2}$ in., in corymbose pedunculate cymes. Inner involucral bracts about 15, linear with lanceolate apex and scarious margins ; outer bracts fewer, much smaller, narrower. Flowers of a bright orange-red colour.

Lower Guinea. Angola, Pungo Andongo, near Caghuy, at a waterfall, Calunda, in flower, December, 1856, *Welwitsch !* radical leaves in October, 1856, at Puri-Cacarambola, *Welwitsch !*

5. **G. amplexicaulis,** *O. & H.* Erect herb, $2\frac{1}{2}$–3 ft. high ; stem pubescent, rooting and dichotomous below, simple above, leafy in lower half, nearly naked in upper half. Leaves obovate-oblong, sessile, amplexicaul, acutely toothed and denticulate, acutely narrowed at the apex, obtuse at the base, puberulous or on the midrib pubescent, mostly 4–5 by 1–$1\frac{1}{2}$ in., those near the base of the stem and also those by the inflorescence smaller. Capitula oblong, about $\frac{1}{2}$ in. long or rather more, on pedicels of $\frac{1}{2}$–$2\frac{1}{2}$ in., about 3–4 together in a small long-pedunculed cyme ; bracteoles filiform. Involucral bracts linear, tapering at the apex, puberulous. Corollas reddish-orange, exceeding the pappus. Anthers exserted.

Nile Land. Niamniam-land, *Schweinfurth !*

80. **CINERARIA,** L.; Benth. et Hook. f. Gen. Pl. ii. p. 445.

Capitula heterogamous, ray-florets ligulate yellow. Involucre campanulate, bracts 1-seriate equal, sometimes with a few outer shorter scales. Receptacle naked. Anther-base unappendaged. Style-branches truncate papillose. Achenes at least the outer more or less compressed; pappus of soft caducous setæ.—Herbs or frutescent, with alternate roundish toothed or more or less lyrately pinnatifid leaves and corymbose cymes of small or medium-sized capitula.

A genus chiefly South African, differing from *Senecio* simply in the compressed achenes.

Disk achenes hispidulous, pale. Terminal lobe of leaves lanceolate	1. *C. Schimperi.*
Achenes glabrous, black. Terminal lobe of leaves rounded	2. *C. abyssinica.*

1. **C. Schimperi,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 184. Erect branched herb or shrubby, 1–10 ft. high or more. Leaves (at least the stem ones) sessile, auriculate-amplexicaul, lyrate-pinnatipartite, puberulous at least beneath, $1\frac{1}{4}$–3 by $\frac{1}{4}$–1 in.; lobes acutely toothed, the terminal one lanceolate acute, much the largest. Capitula $\frac{1}{5}$ in. long, on pedicels of $\frac{1}{8}$–1 in., in a corymbose cyme. Involucral bracts linear acute glabrous. Achenes pale; those of the ray margined, nearly glabrous; those of the disk hispidulous.—*Senecio lyratipartitus,* Schultz Bip. l. c. iii. n. 1843; A. Rich. Fl. Abyss. i. p. 439.

Nile Land. Abyssinia, *Schimper! Hildebrandt!*

2. **C. abyssinica,** *Schultz Bip. in Hb. Schimp. Abyss.* i. n. 335. Repeatedly branched herb, slightly shrubby at base, $\frac{1}{2}$–2 ft. high or more. Leaves pinnatipartite or pinnatifid, often lyrately so, sometimes not pinnately lobed, petiolate or the upper ones subentire or simply dentate, sessile and amplexicaul, 1–$2\frac{1}{2}$ by $\frac{1}{4}$–$2\frac{1}{2}$ in., including the petiole which is sometimes above 1–2 in. long, glabrescent above, whitish and subtomentose below; lobes dentate and usually shallowly lobed, the terminal one of the lower leaves round in outline, much the largest. Capitula about $\frac{1}{4}$ in. long, on pedicels of $\frac{1}{12}$–1 in., in an ample corymbose cyme. Involucral bracts linear, acute, gradually tapering towards the apex, subglabrous or slightly woolly. Achenes glabrous, black, margined, not winged, with a prominent rib on the back and a less conspicuous one on the face.—A. Rich. Fl. Abyss. i. 433.

Nile Land. Abyssinia, *Schimper!* 6–13,000 ft. alt.; at great altitude on the Silké, *Ferret and Galinier.*

Specimens collected by Mr. New on Kilima-njaro, at the last zone of vegetation below perpetual snow may be a glabrate variety of this species.

The following forms differ from the type:—

(1.) *longiradiata.* Upper leaves pinnately lobed, with large auricles; lower leaves not pinnately lobed. Outer florets with rays about as long as the involucre.—*C. grandiflora,* Vatke in Linnæa xxxix. p. 503 (1875). Abyssinia, *Schimper!*

(2.) *Rothii.* Nearly all the leaves without pinnate lobes. Rays short. Abyssinia, *Roth!*

81. **EMILIA**, Cass.; Benth. et Hook f. Gen. Pl. ii. p. 445.

Capitula homogamous discoid, florets ☿ orange or scarlet. Involucre cylindrical or campanulate; bracts 1-seriate equal without a calyculus. Receptacle naked. Anther-base unappendaged. Style-branches terminating in an acute appendix. Achenes 5-angled or subterete; pappus of copious fine white soft setæ.—Herbs with radical or alternate cauline leaves and loosely cymose or subsolitary pedunculate capitula.

A small tropical genus scarcely distinguishable from *Senecio*.

Stem-leaves at least the upper ones auriculate.
  Involucre equalling the florets . . . . . 1. *E. sonchifolia.*
  Involucre falling short of the florets.
    Stem branched, leafy . . . . . 2. *E. sagittata.*
    Stem short, nearly simple; leaves subradical . . . 3. *E. pumila.*
Leaves not auriculate . . . . . 4. *E. cæspitosa.*

DOUBTFUL SPECIES.

Upper leaves cordate-amplexicaul . . . . . 5. *E.? gracilis.*

1. **E. sonchifolia,** *DC. Prodr.* vi. p. 302. Glabrous or puberulous, somewhat glaucous annual, 6–24 in. high or more, erect or diffuse, more or less branched. Leaves lyrate- or cordate-amplexicaul, more or less toothed, 1–4 in. long, sessile or the lowest ones petiolate, the upper ones auriculate. Capitula cylindrical, about $\frac{3}{8}$ in. long, on slender pedicels ranging up to 2 in. long, in a rather lax cyme. Involucral bracts glabrous or puberulous, linear, acute, equalling the purple or orange-purple florets.—*Cacalia sonchifolia*, L. Sp. Pl. ed. i. 835; *E. purpurea*, Cass. Dict. xxxiv. p. 393; *E. rigidula*, DC. l.c.

Upper Guinea. Sierra Leone, *Afzelius!*
Mozamb. Distr. Quilimane, *Kirk!*
A very widely distributed tropical weed, reaching India, America, etc.

2. **E. sagittata,** *DC. Prodr.* vi. p. 302. Erect glabrous or puberulous annual, $\frac{1}{4}$–4 ft. high, usually glaucescent. Leaves sagittate-amplexicaul, oval-ovate or oblong, denticulate or subentire, 1–4 by $\frac{1}{4}$–$2\frac{1}{2}$ in., sessile or the lowest ones narrowed at base into a petiole. Capitula $\frac{1}{4}$–$\frac{2}{5}$ in. long, campanulate, on pedicels ranging up to $2\frac{1}{2}$ in., in a loose cyme or subsolitary. Involucral bracts linear, acute, glabrous or puberulous, falling short of the yellow red or orange florets.—*Cacalia sagittata*, Vahl Symb. iii. p. 91; *Emilia flammea*, Cass. Dict. xiv. p. 406, "alt. iii. t. 5;" *E. sonchifolia*, Benth. in Hook. Niger Fl. p. 439, non DC.

Upper Guinea. Abbeokuta, *Irving!* Ambas Bay, *Mann!* Old Calabar, *Robb!* Niger, *Barter!* Gaboon, *Jardin.*
North Central. Monbuttu-land, *Schweinfurth!*
Nile Land. White Nile, *Murie!*
Lower Guinea. Angola, *Monteiro!* (florets scarlet).
Mozamb. Distr. Zanzibar and Zungomero, *Speke and Grant!* Zanzibar and Cabaceira, *Peters!* Manganja-hills, *Meller!* Moramballa, *Kirk!* 3500 ft. alt.; River Shire Valley, *Kirk!* Zanzibar, *Hildebrandt!*
Occurs also in India.

Emilia humifusa, DC. Prodr. vi. p. 302, i.e., *Cacalia humifusa*, Boj. ex DC. l.c., from the Island of Zanzibar, may be a decumbent state of this species.

3. **E. pumila,** *DC. Prodr.* vi. p. 302. Erect annual, 3½ in. high, quite glabrous except the base. Stem nearly naked, bifid. Leaves subradical, subentire, the upper oval, sessile, amplexicaul 1½ by ½ in., the lower narrowed at the base into a petiole. Bract linear, amplexicaul, ½ in. long. Capitula campanulate, ⅓ in. long. Peduncles 1¾–2 in. long. Involucral bracts linear, acuminate, falling short of the yellow florets.—*Cacalia pumila,* Bojer ex DC. l.c.

Mozamb. Distr. Zanzibar Island, *Bojer!*

4. **E. cæspitosa,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 100. A puberulous annual, 1 ft. high, much branched at the base. Branches ascending, leafy below, nearly naked above, simple or nearly so. Leaves linear-oval, the upper ones somewhat lanceolate, the uppermost linear, obtuse or with a callous tip, sessile, minutely or obsoletely denticulate, mostly glabrous or very nearly so, ½–2½ by $\frac{1}{16}$–½ in., not auriculate at base. Capitula ¼–⅜ in. long, widely campanulate or nearly hemispherical, on pedicels of ¼–2 in., 3 or 4 together terminating the branches. Involucral bracts narrowly linear, acute, more or less scattered with crisped hairs, falling short of the orange florets.—*Emilia,* n. 8, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Karagué, *Speke and Grant!*

5. **E.? gracilis,** *DC. Prodr.* vi. p. 303. An annual herb, about a foot high. Stem herbaceous, erect, branched, sparingly lanate. Lower leaves ovate, acute, attenuate at the base into the petiole; upper leaves sessile, cordate-amplexicaul, spathulate-lanceolate, all crenate, membranous, reticulate-venose. Upper branches naked, bearing at the apex 2 pedicellate capitula. Capitula cylindrical, ecalyculate. Florets pale yellow, the outer ones sterile ?, the central ones hermaphrodite. Style-branches capillary, quite patent, almost like those of *Gynura.*—*Cacalia gracilis,* Boj. mss. et ic. ex DC. l.c.; *? C. tenuissima,* Boj. in Rapp. Soc. Maur. vi. p. 27, ex DC. l.c.

Mozamb. Distr. Zanzibar Island, in sandy places near the sea shore, *Bojer.*

82. NOTONIA, DC., Benth. et Hook. f. Gen. Pl. ii. 446.

Characters of *Senecio,* with discoid capitula, with or without a calyculus, differing in the continuous ovate or lanceolate papillose extremities of the style-branches.—Glabrous fleshy undershrubs with succulent or rudimentary leaves and rather large solitary or cymose scarlet (or yellow) capitula.

A small genus represented also in India. The following are endemic.

Achenes glabrous.
- Involucral bracts 13–15 . . . . . 1. *N. abyssinica.*
- Involucral bracts 8–10.
  - Leaves narrowly fusiform . . . . . 2. *N. coccinea.*
  - Leaves flat but fleshy.
    - Corollas exceeding the pappus. Heads ¾ in. long . 3. *N. Grantii.*
    - Corollas falling short of the pappus. Heads 1–1½ in. long . . . . . 4. *N. Schweinfurthii.*

Achenes hairy . . . . . 5. *N. trachycarpa.*

1. **N. abyssinica,** *A. Rich. Fl. Abyss.* i. p. 444, t. 59. Glabrous, glaucescent, fleshy. Stem erect, 2 ft. high or more, terete, somewhat branched above, with scattered leaves. Radical leaves thick, elliptical, narrowed at both ends, 2–3¼ in. long; stem-leaves narrowly elliptical, acute or obtuse, narrowed towards the base, sessile, 1–4 in. long, repand. Capitula hemispherical, 1–2 in. diameter, very many-flowered, few in a cyme, on bracteate peduncles or pedicels of 1–6 in., without calyculus. Involucral bracts 13–15, broadly linear, with narrow scarious margins and lanceolate acute tip scarcely equalling the florets. Florets scarlet. Achenes glabrous.—*Cacalia abyssinica*, Br. in Salt Abyss. App. p. lxv. (name only); *N. Hildebrandtii*, Vatke in Oest. Bot. Zeitschr. xxvii. 197.

Nile Land. Abyssinia, *Q. Dillon!* Chelicut, *Salt! Schimper!*
Mozamb. Distr. Zanzibar Coast, at Mombassa, in stony places, with red flowers, March, 1876, *Hildebrandt!*

2. **N. coccinea,** *O. & H.* A glabrous fleshy glaucescent perennial herb, 3–12 in. long, decumbent or ascending from a nodose or tuberous root, leafy at the base, scapiform above. Leaves narrowly fusiform, acute, narrowing towards both ends, sessile, 1–3 in. long. Capitula broadly campanulate, ⅝–¾ in. long, 1–3 together; peduncle 2–8 in. long; pedicels 1–1¼ in. long, bracteate. Calyculus wanting. Involucral bracts 8–10, broadly linear, striate, rigid, terminating in a long acumen, ⅗–⅔ in. long, glaucous. Florets all tubular, numerous, very bright scarlet, hermaphrodite. Achenes glabrous, striate. Pappus rather falling short of the corollas.

Nile Land. Abyssinia, *Roth!*

3. **N. Grantii,** *O. & H.* Short fleshy glabrous glaucescent perennial, 4 in. high, from a tuberous root. Stem scapiform, bearing a few linear scale-like leaves and above about 2 stalked heads. Lower or radical leaves elliptical, narrowed at both ends or rounded and retuse at the apex, sessile, ½–¾ in. long. Capitula campanulate-hemispherical, ¾ in. long or rather more, discoid, 20-flowered or more, rounded at base, without calyculus; pedicels 1 in., more or less. Involucral bracts 10, broadly linear, rigid, striate, with scarious margins and lanceolate coloured tip, ⅔–¾ in. long, exceeding the pappus, rather falling short of the blood-red or port-wine coloured corollas. Achenes glabrous.—*Kleinia?* sp., Speke, Nile Journ. App. 638.

Mozamb. Distr. M'bŭmi, 6° 56′ 30″ S. Lat., *Col. Grant!*

4. **N. Schweinfurthii,** *O. & H.* A fleshy glabrous glaucescent perennial, scarcely a foot high. Stems leafy below, simple or bifid, nearly naked above. Leaves narrowly elliptical, acute, narrowed towards the base, sessile, 1–2 in. long. Capitula campanulate, 1–1½ in. long, on bracteate peduncles of 6–8 in., solitary, many-flowered. Involucral bracts linear or oblong, of unequal breadth, faintly striate, ⅝–⅞ in. long, with scarious margins and lanceolate or triangular tip, falling short of the purple corollas, 8–10, sometimes with some long

narrow acute outer bracts added. Achenes glabrous, shining, $\frac{1}{4}$ in. long. Pappus exceeding the corollas.

Nile Land. Dar Fertit, by Damuri on the Pango, *Schweinfurth!*

5. **N. trachycarpa,** *Kotschy in Pl. Binder.* p. 21, t. 8 (1866). A procumbent fleshy somewhat shrubby herb, quite glabrous, branched from the base. Sterile branches leafy, 2–4 in. long, thick; flowering branches thicker, longer, nearly leafless by the previous fall of the leaves. Leaves subulate-terete, subdecurrent, approximated, erect-patent, ranging up to $\frac{1}{2}$ in. long. Peduncles scapiform, 3–9 in. long, terminal, 2 together, gradually thickened toward the apex, remotely bracteate. Capitula solitary, oblong-campanulate, 1 in. long, not calyculate. Involucral bracts 8–9, linear, acute or pointed, $\frac{3}{4}$–$\frac{7}{8}$ in. long. Florets about 30, all tubular; corolla lilac or rose-coloured. Achenes compressed, 10–12-costate, setulose, nearly $\frac{1}{6}$ in. long.—*N. semperviva*, Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 152, n. 792 (1867); *Cacalia semperviva*, Forsk. Fl. Ægypt; Arab. p. 146 (1775); *C. sempervirens*, Vahl Symb. iii. p. 92 (1794); *Kleinia semperviva*, DC. Prodr. vi. p. 339; fide Aschers. in Schweinf.Beitr. Fl. Æthiop. p. 152, n. 792 (1867).

Nile Land. Abyssinia, Boghos, *Hansal, Schimper*, Habab, *Hildebrandt*, 424; ? Somali, *Hildebrandt!* 844, 1447, at altitude of 4000–5000 ft., on chalk (*N. semperviva*, Aschers. in Schweinf. Fl. Æthiop. 152).

Kotschy l.c. quotes as synonymous, but with a mark of doubt, *Cacalia pendula*, Forsk. Fl. Æg.-Arab. 145 (*Kleinia? pendula*, DC. Prodr. vi. 339) from Arabia Felix.

Ascherson, l.c., unites the Abyssinian plant with Forskal's Arabian species, *Cacalia semperviva;* the latter, however, is described as heads 60-flowered. He also unites *N. grandiflora*, DC., i.e., *Cacalia grandiflora*, Wall., an East Indian species.

83. **SENECIO,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 441.

Capitula heterogamous radiate, ray-florets ♀ ligulate or wanting and homogamous. Involucre from hemispherical to cylindrical; bracts 1-seriate, equal, erect, imbricate (often by narrow margins), free, sometimes inserted around a distinctly dilated receptacle, with a few outer usually much shorter bracts at the base forming a calyculus. Receptacle naked or shortly fimbrillate. Style-branches recurved or spreading truncate and penicillate or with a short terminal appendix. Achenes subterete usually 5–10-costate or striate; pappus copious of fine white setæ.—Herbs shrubs or arborescent, with alternate entire toothed pinnatifid or variously lobed leaves rarely aphyllous, and solitary or cymose heads, usually yellow or purple.

An enormous cosmopolitan genus; most of the following species appear to be endemic.

Root annual, or occasionally biennial (as in *S. arabicus*, L.)
- Calyculus obsolete.
  - Capitula radiate.
    - Capitula 1–3 together, on peduncles of 3–7 in. . . 1. *S. abyssinicus.*
    - Capitula 4–12 together or more, on pedicels ranging up to $1\frac{2}{3}$ in. . . . . 2. *S. discifolius.*
  - Capitula discoid, without rays . . . . . 3. *S. (?) emilioides.*
- Calyculus present.
  - Capitula discoid, without rays.
    - Leaves pinnatisect or pinnatifid.

Cyme compact, dense . . . . . 4. *S. vulgaris.*
Cyme broad, rather lax . . . . . 5. *S. arabicus.*
Leaves undivided . . . . . 6. *S. Schimperi.*
Capitula radiate.
Leaves fleshy, linear or with linear lobes . . . . 7. *S. coronopifolius.*
Leaves not or scarcely fleshy; lobes usually not linear.
Ligule of the ray-florets very small. Bracts of the calyculus lanceolate-acuminate . . . 8. *S. pinnatipartitus.*
Ligule of the ray-florets of moderate size. Bracts of the calyculus subulate or filiform . . . 9. *S. Perrottetii.*
Root perennial.
Stem rigid or wiry, not fleshy.
Appendix of the style-branches long and tapering. Involucre with a broad flat base.
Leaves sessile . . . . . 10. *S. picridifolius.*
Leaves petiolate . . . . . 11. *S. macropappus.*
Appendix of the style-branches short or obsolete. Involucre with a campanulate or turbinate base.
Habit erect or ascending, not cæspitose.
Herbs or undershrubs.
Florets yellow.
Capitula discoid, without rays.
Rhizome tuberous. Heads narrowly turbinate . . . . . 12. *S. tuberosus.*
Root thick, woody. Heads campanulate 13. *S. Hochstetteri.*
Capitula radiate (or in *S. steudelioides* with inconspicuous or obsolete rays).
Inflorescence few (3–13)-headed, lax . . 14. *S. paucifolius.*
Inflorescence many-headed or dense.
Calyculus obsolete . . . . . 15. *S. bupleuroides.*
Calyculus present.
Stem leafy below, with few leaves above . . . . . 16. *S. lasiorhizus.*
Stems leafy above.
Involucres narrowly campanulate, of 8–10 bracts . . . . . 17. *S. confertus.*
Involucres campanulate or hemispherical, of 13–30 bracts.
Leaves undivided.
Achenes glabrous.
Involucres campanulate, of 13–20 bracts.
Leaves from ovate or oblong to lanceolate.
Achenes black or dark brown.
Leaves green on both sides . . . 18. *S. subsessilis.*
Leaves white-tomentose beneath . . . 19. *S. Burtoni.*
Achenes pale . . . 20. *S. ochrocarpus.*
Leaves linear-lanceolate 21. *S. Steudelii.*
Leaves elongate-linear-lanceolate . . . 22. *S. Fresenii.*
Involucres hemispherical, of 25–30 bracts . . 23. *S. Schultzii.*
Achenes setulose . . . . 24. *S. myriocephalus.*

Leaves coarsely dentate or pinnately toothed. Achenes setulose	25. *S. steudelioides.*
Leaves deeply pinnatifid	26. *S. farinaceus.*
Florets red	27. *S. clarenceana.*
Trees.	
Leaves undivided. Capitula about 6-flowered	28. *S. Mannii.*
Leaves pinnatifid. Capitula about 22-flowered	29. *S. gigas.*
Habit cæspitose	30. *S. Unionis.*
Habit scandent or rampant.	
Leaves all undivided, glabrous, obsoletely denticulate. Florets about 20. Involucral bracts 8–9	31. *S. Petitianus.*
Leaves all undivided, puberulous, multidentate. Florets 14–16. Involucral bracts (5-) 8–9.	
Petioles not auriculate at the base. Outer florets female	32. *S. clematoides.*
Petioles auriculate at the base. Florets all hermaphrodite	33. *S. deltoideus.*
Leaves undivided, repand-angular. Florets numerous. Involucral bracts about 12	34. *S. Tedliei.*
Leaves undivided, coarsely dentate. Florets numerous. Involucral bracts about 12	35. *S. Forbesii.*
Leaves undivided or some pinnately tripartite, remotely dentate. Florets 10	36. *S. Biafræ.*
Leaves pinnately lobed.	
Leaf-lobes oblong ovate or obovate. Involucral bracts 5	37. *S. subscandens.*
Leaf-lobes sublinear. Involucral bracts 8	38. *S. gabonicus.*
Stem and leaves fleshy	
Florets 5–10	39. *S. longiflorus.*
Florets 13–22	40. *S. kleinioides.*

1. **S. abyssinicus,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 67. Annual, erect, simple or branched, 3–16 in. high. Stem striate, angular, scattered with crisped hairs. Leaves spathulate or spathulate-orbicular, obtuse, the upper ones sessile, the lower suddenly narrowed into a petiolar half, more or less toothed in upper part, scattered with crisped hairs sometimes but sparsely, $\frac{1}{2}$–$1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{12}$–$\frac{2}{3}$–$1\frac{1}{3}$ in. Bracteoles filiform, sometimes minute. Capitula $\frac{1}{5}$–$\frac{1}{4}$ in. long, campanulate-oblong, on slender glabrous often bracteolate pedicels ranging up to $1\frac{2}{3}$ in. long, 4–12 together or more in a rather close cyme. Calyculus absent. Involucral bracts narrowly lanceolate, acute, striate, glabrous, equalling the florets, with narrow scarious margins. Outer florets with a small yellow ray. Achenes costate, setulose; setulæ short, thick.—A. Rich. Fl. Abyss. i. p. 438; *S. bellidifolius*, Rich. Fl. Abyss. i. p. 439, non H. B. K.; *S. Quartinianus*, Aschers. in Schweinf. Beitr. Fl. Æthiop. p. 158.

North Central. Monbuttu-land, *Schweinfurth!*

Nile Land. Abyssinia, Chiré, *Q. Dillon and Petit! Schimper! Hildebrandt!*

A specimen 28 in. high, much branched and with many heads, collected by *Speke and Grant* at Unyoro, in fields, may be a large state of this species.

2. **S. discifolius,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 100. Annual, erect, 12–15 in. high, with few branches. Stem and ascend-

ing branches scattered with white crisped hairs. Leaves orbicular, ¾–2 in. diameter, except the uppermost obovate-spathulate ones, repand-denticulate, retuse depressed or very obtuse at apex, puberulous, suddenly narrowed into an alate petiolar half of ¾–1⅓ in. Capitula widely campanulate, ⅓ in. long, 1–3 together, on peduncles of 3–7 in. terminating the branches. Calyculus absent. Involucral bracts broadly linear with an ovate acute apex, striate, glabrous, with narrow scarious margins, reflexed after flowering. Outer florets with an orange or golden-coloured ligule, oval, trifid at apex, reflexed, ⅛ in. long. Achenes (immature) costate, setulose on the ribs; setulæ very short. Receptacle convex, ⅕ in. diameter.—*Emilia*, n. 1, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Uganda, *Speke and Grant!* (1° N. Lat. in the plantain groves); Niamniam-land, *Schweinfurth!*

3. **S.? emilioides,** *Schultz Bip. in herb. Vindob.*; *Æthiop. Kotsch.* 1837–8, n. 203, *et in Schweinf. Beitr. Fl. Æthiop.* p. 158. A glabrous annual, branched from the base. Capitula discoid, twice the size of those of *S. abyssinicus*, Schultz Bip. Involucral bracts in one row. Style-branches penicillate-truncate at the apex.

Nile Land. Æthiopia, Sennaar?, *Kotschy*.
We have not seen the specimen.

4. **S. vulgaris,** *Linn. Sp. Pl.* edit. i. p. 867 (1753). Erect, glabrous, 6–18 in. high, branched from the base, annual. Branches terete, striate. Lowest leaves dentate or subentire, oblong-spathulate, petiolate, scarcely 1 in. long, stem-leaves pinnatifid or pinnatipartite, sessile, auriculate-amplexicaul, ranging up to 2 by 1 in., segments distant, spreading, oblong or ovate, obtuse, as well as the rhachis more or less toothed. Capitula oblong, discoid, ⅕ in. long, on short slender pedicels, in dense corymbose cymes. Calyculus of several minute appressed bracts. Involucral bracts linear. Achenes puberulous.—DC. Prodr. vi. p. 341. *S. gaffatensis*, Vatke in Linnæa xxxix. p. 505 (1875).

Nile Land. Abyssinia, in meadows near Gaffat, 8100–8200 ft. alt., *Schimper!*
Widely spread over Europe and the East, extending to America, and introduced into New South Wales.

5. **S. arabicus,** *Linn. Mant.* i. p. 114. Annual, glabrous in most parts, about ¾–1¼ ft. high, not much branched, leafy. Leaves pinnatifid or pinnatipartite, mostly oval in general outline, 1–3½ in. long, upper sessile amplexicaul or subpetiolate with an auriculate base, lower narrowed into a petiole; lobes dentiform or toothed. Capitula campanulate, ¼ in. long, on slender pedicels ranging up to ¾ in., in a divaricate corymbose cyme. Calyculus of 6–9 short bracts. Involucral bracts linear with a lanceolate tip and scarious margin, equalling the pappus. Ligule absent. Achenes puberulous all over, costate.—DC. Prodr. vi. 342. *S. ægyptius*, Linn., *β. discoideus*, Boiss. Fl. Or. iii. p. 388 (1875).

Nile Land. Cordofan, *Kotschy!* Nubia, Islands in the Nile, *Bromfield!*
Occurs also in Egypt.

6. **S. Schimperi,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 144 et iii. n. 1880. Annual, but somewhat woody and often branched at the base, erect, glabrous, 1–1½ ft. high. Leaves numerous, linear, narrowed to a callous tip, fleshy, entire or obscurely calloso-denticulate, margins revolute, ½–2½, sessile. Capitula campanulate, ¼–⅓ in. long, on pedicels of ⅛–2 in., in a corymbose cyme. Calyculus of 10–12 lanceolate-acuminate bracts. Involucral bracts narrowly lanceolate acute, 3-nerved, with narrow scarious margins, rather falling short of the florets. Ray-florets wanting. Achenes terete, costate, setulose on the ribs; setulæ very short.—A. Rich. Fl. Abyss. i. p. 435.

Nile Land. Abyssinia, *Schimper! Roth! Q. Dillon, Petit.*

According to Ascherson in Schweinfurth's Beitr. Fl. Æthiop. p. 158, this species also occurs in Arabia.

7. **S. coronopifolius,** *Desf. Fl. Atl.* ii. p. 273. Annual, 4–24 in. high, erect, branched, glabrous in most parts. Leaves fleshy, sessile, semi-amplexicaul, pinnately lobed or entire, ⅓–2 in. long, lobes linear and sometimes dentate or dentiform; margins revolute. Capitula campanulate, at length hemispherical, about ¼ in. long, 1 or few together, on peduncles or pedicels ranging up to 1½ in., forming a wide corymbose cyme. Calyculus of 6–8 short lanceolate bracts. Involucral bracts linear, sometimes broadly so, with a lanceolate tip, dark-coloured at the apex, with narrow scarious margins, about equalling the florets. Ligule of the marginal florets oblong, shorter than the involucre. Achenes costate, minutely setulose.—DC. Prodr. vi. p. 344. *S. Rüppellii*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 157, n. 812.

Nile Land. Abyssinia, *Schimper!*

Occurs in the Oriental regions and extends to Affghanistan.

8. **S. pinnatipartitus,** *Schultz Bip. in Herb. Schimp. Abyss.* iii. n. 1873. Annual, glabrous or nearly so, erect, simple or but little branched, 9–18 in. high. Lowest leaves subrotund or oval, ½–1 in. long, dentate, narrowed into a petiole of ⅓–1¼ in.; lower leaves pinnatipartite, sublyrate, petiolate, 1¼–2¼ in. long, including the petiole; upper leaves rather smaller, sessile, pinnatipartite, with linear or oblong toothed or entire lobes. Capitula campanulate, about ¼ in. long, on pedicels of ¼–1 in., in rather small corymbose cymes of 1–2 in. diameter. Calyculus of short lanceolate-acuminate bracts. Involucral bracts linear, about 3-nerved, with a lanceolate tip and a narrow scarious margin, equalling the florets. Ligule of the ray-florets recurved, very short. Achenes costate, setulose on the ribs; setulæ short, thick.

Nile Land. Abyssinia, *Schimper!*

A. Richard in Fl. Abyss. i. p. 438, unites this with *S. ægyptius*, Linn., regarding it as a less luxuriant state of the latter, from which however it appears to differ by the shape of the involucre and by the broader figure of the involucral bracts.

9. **S. Perrottetii,** *DC. Prodr.* vi. p. 343. Annual, erect, glabrous, simple or branched, 1–2 ft. high. Lower leaves attenuate into

a petiole; upper leaves sessile, auriculate-amplexicaul, dentate or incise-pinnatifid, oval or oblong, obtuse or apiculate, 1–3½ in. long. Capitula widely campanulate, about ¼ in. long, on pedicels of ½–1 in. long, in a corymbose cyme. Calyculus of a few short subulate or filiform bracts. Involucral bracts narrowly linear, acuminate, 2–1-nerved, with scarious margins, equalling the florets. Ligule of ray-florets 5–4-nerved, full or half the length of the involucre. Achenes costate, minutely setulose on the ribs.—*S. strictus*, DC. l. c.

Upper Guinea. Senegambia, *Perrottet!*

10. **S. picridifolius,** *DC. Prodr.* vi. p. 386. Perennial herb, simple or branched, 1–2½ ft. high or more; stem terete, striate, shortly pubescent. Leaves oval-oblong or ovate, acutely toothed, puberulous or glabrous, sessile, auriculate or narrowed at base, 1½–4½ by ⅜–1½ in. Capitula campanulate, with a broad truncate base, ½–⅝ in. long, 1 or few together, on peduncles of 3–6 in. Calyculus of several linear ciliate or glabrate small bracts. Involucral bracts linear, puberulous or glabrate, acute, with narrow thinner margins. Ray-florets none. Achenes costate, glabrous on the ribs, minutely hairy between the ribs. Pappus ultimately exceeding the involucre.—Harv. Fl. Cap. iii. p. 379. —*S. acutidentatus*, A. Rich. Fl. Abyss. i. p. 436. *S. papaverifolius*, A. Rich. l. c. p. 437.

Nile Land. Abyssinia, *Quartin Dillon and Petit! Schimper!*
Occurs also in Natal and the Transvaal republic of South Africa.
S. papaverifolius is a luxuriant state with large auricles at the base of the leaves.
An aquatic form with more numerous and smaller heads and with a decumbent habit was collected by *Schweinfurth!* by Gazelle River.

11. **S. macropappus,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 844. Perennial herb, puberulous or scabrid, 2–5 ft. high, branched. Leaves ovate, closely irregularly and often unequally dentate, shortly acuminate or apiculate, truncate or excavated at the base, 1–2½ by ½–2 in.; petioles ranging up to 1½ in., auricled at the base. Capitula solitary or few together, campanulate, with a wide truncate base, ½–⅝ in. long, on peduncles or pedicels of 3–6 in., not radiate. Calyculus consisting of several small linear ciliate bracts. Involucral bracts linear, acute, subglabrous. Florets yellow. Achenes costate, setulose between the ribs. Pappus exceeding the involucre.—A. Rich. Fl. Abyss. i. p. 436.

Nile Land. Abyssinia, *Schimper! Q. Dillon, Petit!*

12. **S. tuberosus,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 1361. Root tuberous, fleshy, white, 1–3 in. diameter. Stems herbaceous, erect, glabrous 7–18 in. high, leafy at the base, simple or nearly so. Lower leaves elliptical or ovate-elliptical, coarsely or sinuately toothed or some 3-lobed, subglabrous or puberulous, obtuse, cuneate at the base into a petiole of 1½–3 in., altogether 4–8 by 1½–4 in.; upper leaves with shorter petioles or subsessile, more deeply toothed and smaller. Capitula narrowly turbinate, ¼ in. long, 4–6-flowered, not

radiate, on short pedicels, in a dense subumbelliform cyme 1–3 in. diameter. Calyculus of 2–3 small filiform bracts. Involucral bracts usually 5, linear-oblong, obtuse, with scarious margins. Florets 5. Achenes silky.—A. Rich. Fl. Abyss. i. p. 434, tab. 58. *Cacalia tuberosa*, Delile in Ferret and Galinier, Voy. Abyss. iii. p. 142, non Nutt. *C. abyssinica*, Walp. Ann. ii. p. 908, non Br.

Nile Land. Abyssinia, *Schimper! Petit! Q. Dillon. Beccari!* Gallabat, *Schweinfurth! Ferret and Galinier.*

Root eaten.

S. solanoides, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 159, from Abyssinia, differs from the above by "leaves large sinuate-dentate pinnatifid puberulous."

These two species constitute the genus *Solanecio*, Walp. Rep. vi. p. 273.

13. **S. Hochstetteri,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 268. Rootstock thick, not vertical. Stem erect, terete, striate, subscabrid, 9–18 in. high. Radical leaves numerous, oval-spathulate, obtuse, subscabrid, irregularly toothed or compound-dentate, narrowed at the base into a petiole which is dilated and amplexicaul and about equalling the lamina, altogether 4–13 in. long; stem-leaves few, sessile, linear, small, passing upwards into the bracts. Capitula campanulate, $\frac{3}{8}$–$\frac{1}{2}$ in. long, on pedicels of $\frac{1}{8}$–3 in. long, in a rather lax corymb. Calyculus of few small lax linear bracts. Involucral bracts linear-lanceolate, glandular-puberulous, about 10. Florets all tubular, numerous. Achenes slightly hairy.—A. Rich. Fl. Abyss. i. p. 435.

Nile Land. Abyssinia, *Schimper!*

14. **S. paucifolius,** *DC. Prodr.* vi. p. 403. An erect glabrous perennial herb, 1–2 ft. high. Root thickened. Stem leafy towards the base, nearly naked above. Leaves oval or obovate, obtuse or apiculate, with a few teeth or nearly entire, narrowed towards the scarcely petiolate base, 1–3 by $\frac{1}{3}$–1 in. Capitula broadly campanulate, $\frac{1}{3}$–$\frac{3}{8}$ in. long, on pedicels of $\frac{1}{2}$–$2\frac{1}{4}$ in., 3–13 together, in a lax corymbose pedunculate cyme. Calyculus of very few short bracts. Involucral bracts linear, about 12, nearly equalling the florets. Ligule of the ray-florets oblong, about $\frac{1}{6}$–$\frac{1}{4}$ in. long, yellow. Disk-florets very numerous. Achenes glabrous.—Harv. et Sond. Fl. Cap. iii. p. 377.

Mozamb. Distr. Zambesi-land, *Kirk!* Moramballa, 1,500–3,000 ft., *Kirk!*

Occurs also in southern and eastern districts of Cape Colony.

Our specimens differ from the type in less scapiform inflorescence and in not quite entire leaves; they also differ from *S. rhomboideus*, Harv., by the presence of ray-florets.

15. **S. bupleuroides,** *DC. Prodr.* vi. p. 387. Erect glabrous fleshy perennial herb, 2–$2\frac{1}{2}$ ft. high, woolly at the crown of the root; stem leafy, not much branched, striate. Stem-leaves oblong or lanceolate, sessile, cordate-amplexicaul, rigid, 2–5 by $\frac{1}{4}$–$1\frac{1}{4}$ in., margins revolute, denticulate or subentire. Capitula turbinate, $\frac{1}{3}$–$\frac{3}{8}$ in. long, about 15–20-flowered, on slender pedicels of $\frac{1}{5}$–$1\frac{1}{2}$ in., in a repeatedly branched corymbose cyme. Calyculus 0 (in our specimens). Involucral bracts 8–10, linear, with a ciliolate tip, $\frac{1}{5}$ in. long. Ray-florets

3–5; ligule about ¼ in. long, yellow. Disk-florets 12–15, yellow. Achenes glabrous. Receptacle naked.—Harv. et Sond. Fl. Cap. iii. p. 378.

Mozamb. Distr. Manganja Hills, *Meller!* Satshi, alt. 3,000 ft., *Kirk!*
Occurs also in Natal and elsewhere in Eastern districts of the Cape.
S. latifolius, DC. Harv. l. c. 377, does not seem specifically to differ.

16. **S. lasiorhizus,** *DC. Prodr.* vi. p. 387. Erect stout rigid perennial herb, 1–2 ft. high, from a thick woody and woolly rootstock. Stems several, striate, leafy and woolly below, with but few leaves and subglabrescent above. Lower leaves obovate, coriaceous, obtusely pointed, narrowed at base into a petiole, minutely callous-crenate, loosely cobwebbed at least when young, rigid when old, 2–3 by ⅚–1⅓ in.; upper stem-leaves smaller, oblong or lanceolate, sessile, acute. Capitula broadly campanulate, ⅜–½ in. long, on naked pedicels of 1–2½ in., in a lax corymbose cyme. Calyculus of many long linear-subulate bracts. Involucral bracts about 20, linear, acute, somewhat woolly, nearly equalling the florets. Ligule of the ray-florets oblong, ⅓ in. long, yellow. Disk-florets yellow, very numerous. Achenes pubescent. —*Cineraria coronata*, Thunb. Prodr. Pl. Cap., pars post., p. 154; Harv. et Sond. Fl. Cap. iii. p. 369. *S. lasiorhizoides*, Schultz Bip. ex Harv. l. c.

South Central. Makalaka, *Baines!*
Occurs also in Eastern districts of the Cape from Uitenhage to Natal.

17. **S. confertus,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 864. A robust subglabrous perennial herb, 2–4 ft. high. Stem terete, striate, simple below, leafy. Leaves oval or lanceolate, sessile, acute, twice sharply dentate, auriculate at the base, 1–8 in. long, width not exceeding 2 in. Capitula narrowly campanulate, ⅜–½ in. long, on puberulous pedicels ranging up to 1¾ in., in a dense much-branched corymbose or rounded cyme. Calyculus consisting of a few small linear bracts. Involucral bracts 8–10, broadly linear, ⅓–⅜ in. long, puberulous outside, terminating in a tomentose tip. Ligule of the ray-florets yellow, oblong, ⅙–⅓ in. long. Achenes striate, hairy.—A. Rich. Fl. Abyss. i. p. 441.

Nile Land. Abyssinia, *Schimper!*

18. **S. subsessilis,** *O. & H.* A robust erect perennial herb, 4 ft. high or more, glabrous in most parts. Stem terete, striate, simple below. Stem-leaves ovate or elliptical, subsessile, amplexicaul, sharply denticulate, 1–8 in. long, width ranging up to 4 in. Capitula campanulate, ⅜–½ in. long, on puberulous pedicels ranging up to 1 in., in a dense corymbose cyme. Calyculus consisting of several unequal glabrous linear or lanceolate bracts. Involucral bracts 15–20, linear, with thick fleshy median portion and thinner paler margins, about ¼ in. long, glabrous except the ciliolate tips. Ligule of the ray-florets oval-oblong, yellow, ⅓–⅜ in. long. Achenes glabrous, costate, short, dark.

Nile Land. Abyssinia, *Schimper!* Gaffat at elevation of 8,100–8,500 ft.

Much resembling *S. confertus*, Schultz Bip., but differing by broader not auriculate leaves, by the broader involucres with narrower more numerous bracts, and especially by the glabrous achenes.

19. **S. Burtoni,** *Hook. f. in Journ. Linn. Soc. Lond.* vii. p. 202. A robust erect perennial herb, 3–4 ft. high, white-cottony above. Stem striate. Stem-leaves ovate ovate-lanceolate or -oblong, acuminate or acute, sessile, amplexicaul, closely denticulate with callous tips, white-tomentose beneath, thinly so above, 1½–12 by ½–3 in. Capitula campanulate, slightly turbinate, about ½ in. long, on pedicels of ⅓–1 in., in a corymbose or rounded cyme. Calyculus of a few unequal, filiform or linear bracts. Involucral bracts 15–20, linear, with lanceolate tip and scarious margins, about ⅓ in. long, thinly pilose. Ligule of the ray-florets yellow, oval-oblong, about ½ in. long. Disk-florets 30–40. Achenes glabrous, costate, black, ⅛ in. long.

Upper Guinea. Cameroon Mountains, alt., 8–12,000 ft., *Mann!*

20. **S. ochrocarpus,** *O. & H.* An erect leafy pallid perennial shrub-like herb, 4 ft. high or more, from a thickened root covered with tomentose tubercles and giving off elongated fibres. Stem simple or nearly so, sulcate and striate, puberulous. Stem-leaves ovate-lanceolate oval or upper lanceolate, sessile, amplexicaul, subobtuse at the apiculate apex, broad and somewhat or scarcely auriculate at the base, denticulate with triangular apiculate teeth, 2½–7 in. long. Capitula campanulate, ⅜–⅝ in. long, on pedicels of ¼–1¼ in., in a corymbose thinly lanate cyme. Calyculus of a few filiform bracts, ⅓–½ of the length of the involucre. Involucral bracts 13–15, linear, thinly pilose, with a dark tip, ¼–⅓ in. long, arising from a thickened disk which is ultimately conspicuous. Ligule of the ray-florets orange, linear, about ¼ in. long. Corolla of disk-florets with a conical base terminating upwards in a slender constriction. Achenes pale, glabrous, costate, ⅙ in. long.

Nile Land. Abyssinia, *Schimper!* by swamps at elevation of 8,500 ft.

21. **S. Steudelii,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 750. Erect perennial herb, 2–4 ft. high. Stem glabrous and soon naked below, leafy and slightly cottony above, simple or but little branched. Leaves linear-lanceolate, sessile, acute, denticulate, glabrate or somewhat cottony when young, 2–8 in. long; the upper ones cordate-auriculate. Capitula campanulate, ⅓–½ in. long, on bracteate pedicels ranging up to 4 in. in a corymbose cyme. Calyculus of a few lax narrowly linear bracts like those on the pedicels. Involucral bracts about 15, linear-lanceolate, somewhat pubescent, with scarious margin and dark pointed tip, about equalling the disk-florets. Ligule of the ray-florets ⅜–⅝ in. long. Achenes costate, oblong, glabrous.—A. Rich. Fl. Abyss. i. p. 440.

Nile Land. Abyssinia, *Schimper!*

Petit! (var. *a. albido-tomentosa*, Rich. l. c., a luxuriant state with upper part of stem and leaves white-cottony and teeth of leaves irregular and obtuse).

S. steudelioides, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. 157, from Abyssinia, differs from *S. Steudelii*, by sinuate-dentate pinnatifid cottony and hairy achenes, and leaves with revolute margins.

22. **S. Fresenii,** *Schultz Bip. in Schweinf. Beitr. Fl. Æthiop.* p. 160. Perennial, arachnoid, with the habit of *S. paludosus*, Linn. Stems herbaceous. Leaves elongate linear-lanceolate, sagittate, closely serrulate. Capitula radiate, yellow, collected in a crowded corymb. Involucre glabrous.

Nile Land. Abyssinia, between Halei and Temben, *Rüppell.*
We have seen no specimen.

23. **S. Schultzii,** *Hochst. in Herb. Schimp. Abyss.* ii. n. 1278. Erect hispid-pubescent perennial herb, 1–2 ft. high. Stem simple or nearly so, leafy. Leaves linear-oblong, sessile, mostly obtuse, obtusely dentate, 1–6 in. long, the upper ones dilated and somewhat auricled at the base, the lower gradually narrowed downward to near the base. Capitula hemispherical, about 1 in. diam., on bracteate peduncles or pedicels ranging up to $3\frac{1}{2}$ in., in a hemispherical cyme of 3–6 in. diam. Calyculus of many lax narrowly linear bracts, some nearly equalling the involucre. Involucral bracts 25–30, linear, with scarious margins, a lanceolate acuminate apex and dark tip. Ligule of the ray-florets $\frac{1}{2}$–$\frac{3}{4}$ in. long, linear. Achenes glabrous, costate, oblong.—A. Rich. Fl. Abyss. i. p. 444.

Nile Land. Abyssinia, *Schimper!*

24. **S. myriocephalus,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 837 and 1233. An erect leafy suffruticose perennial, 2 ft. or more high. Stem terete, glabrate below, somewhat cottony above. Leaves linear-oval, narrowed towards both ends, sessile, auriculate, denticulate, dark and subglabrous above, white with an obsolete tomentum beneath, 1–4 by $\frac{1}{8}$–1 in. Capitula campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long, very numerous, on pedicels ranging up to 1 in., in a dense much branched corymbose or hemispherical cyme of 4–12 in. diam. Calyculus of a few short lanceolate acuminate bracts. Involucral bracts about 13, linear, acute, nearly glabrous with a ciliolate dark tip. Ligule of the ray-florets oval, about $\frac{1}{4}$ in. long, yellow. Disk-florets yellow. Achenes striate, setulose.—A. Rich. Fl. Abyss. i. p. 441.

Nile Land. Abyssinia, *Schimper! Roth! Petit!*
Used for expelling black ants (*Roth*).

25. **S. steudelioides,** *Sch. Bip. in Schwf. Fl. Æthiop.* p. 157. Branches closely sulcate, thinly appressed, cottony above, glabrate below. Leaves linear-oblong, coarsely dentate or unequally pinnately toothed, the lower occasionally with a large median lobe on either side, more or less whitish cottony especially beneath, at length glabrescent, 2–3 in. long. Capitula loosely cymose, discoid or ray inconspicuous, yellow, broadly campanulate, $\frac{2}{3}$–$\frac{3}{4}$ in. diam., on peduncles varying to 1 in. or more. Calyculus of rather long linear or subulate bracts. Involucral bracts 15–20, oblong-lanceolate, more or less cottony. Achenes setulose.

Nile Land. Abyssinia, alt. 10,500 ft., *Schimper!*

26. **S. farinaceus,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 751. Erect or ascending, perennial, shrubby below, cæspitosely branched,

more or less white with a short woolly sometimes obsolete tomentum especially on the lower surface of the leaves, 1–2 ft. high or more. Leaves deeply pinnatifid, oblong or obovate in outline, petiolate or the uppermost ones auriculate and sessile, $\frac{3}{4}$–3 in. long; lobes oval ovate or oblong, mostly toothed or again pinnatifid. Capitula broadly campanulate slightly turbinate, $\frac{3}{8}$–$\frac{1}{2}$ in. long, on peduncles of $\frac{1}{2}$–2 in., solitary or subcymose. Calyculus of long linear bracts. Involucral bracts 15–20, linear, mostly cottony, about equalling the yellow florets. Ligule of the ray-florets oval or linear-oblong, about $\frac{3}{8}$ in. long. Achenes striate, setulose.—A. Rich. Fl. Abyss. i. p. 443.

Nile Land. Abyssinia, 12–13,500 ft. alt., *Schimper!*

27. **S. clarenceana,** *Hook. f. in Journ. Linn. Soc. Lond.* vi. p. 14. Erect perennial herb, 1–5 ft. high, simple or branched, nearly glabrous or inconspicuously pubescent, leafy. Leaves oval or oblong, sessile, obtuse, auricled at the base, sinuously dentate or pinnately lobed with dentate lobes, $1\frac{1}{2}$–$5\frac{1}{2}$ by $\frac{1}{3}$–$1\frac{2}{3}$ in. Capitula campanulate, $\frac{3}{8}$–$\frac{2}{3}$ in. long, not radiate, on pedicels ranging up to $\frac{2}{3}$ in., in a dense corymbose cyme. Calyculus of a few very small bracts. Involucral bracts about 13, linear, acuminate, glabrous or densely pubescent with curly hairs. Florets red, 30–40. Achenes glabrous.

Upper Guinea. Fernando Po, at 9,000 ft. alt., *Mann!* Cameroon Mountains, at 7–11,000 ft. alt., *Mann!*

Much resembling *S. purpureus* Linn., from Table Mountain and other parts of Cape Colony; it may prove to be the same species.

28. **S. Mannii,** *Hook. f. in Journ. Linn. Soc. Lond.* vi. p. 14. A shining nearly glabrous tree, 15–25 ft. high. Branches leafy at the apex. Leaves narrowly oval, acuminate, taper-pointed, denticulate, puberulous on the midrib beneath, attenuate to a shortly petiolate base, membranous, 4–9 by 1–$2\frac{1}{2}$ in., besides petiole of $\frac{1}{4}$–1 in. Capitula oblong, $\frac{1}{3}$ in. long, on short slender puberulous pedicels in dense panicled cymes. Calyculus consisting of a few filiform bracts. Involucral bracts 5, linear, somewhat cymbiform, glabrous, with an outcurving lanceolate tip. Florets about 6, all tubular, yellow. Achenes minutely hairy.

Upper Guinea. Cameroon Mountains, alt. 2,500–7,500 ft. and Fernando Po, alt. 6,000 ft., *Mann!*

29. **S. gigas,** *Vatke in Linnæa* xxxix., p. 506 (1875). An erect tree with the habit of a palm, leafless below for 15–20 ft., with a leafy crown at top. Branches thick, pulverulent-tomentose towards the top. Leaves oval, pinnatifid, membranous, puberulous above, more so and paler beneath, 6–18 by $3\frac{1}{2}$–9 in., base sessile or subsessile, usually auriculate; lobes ovate or oblong, serrate-denticulate and somewhat lobed. Capitula campanulate-oblong, $\frac{1}{3}$–$\frac{2}{5}$ in. long, on short bracteolate pedicels in dense bracteate corymbose or rounded cymes. Calyculus consisting of several narrowly linear pubescent bracts. Involucral bracts 8, broadly linear, glabrous or nearly so, subobtuse, $\frac{1}{4}$ in. long or

rather more, with ciliolate tip and thinner margins. Florets all tubular, about 22, yellow. Achenes glabrous, small, brown.

Nile Land. Abyssinia, *Schimper!*

30. **S. Unionis,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 1272. Much branched and cæspitose perennial herb, 3–8 in. high; branches mostly glabrous. Leaves cauline, linear, obtuse, sessile, more or less toothed or pinnatifid, somewhat narrowing from the middle downwards, mostly erect, $\frac{1}{4}$–$1\frac{1}{4}$ in. long, margins revolute. Capitula subhemispherical, about $\frac{1}{3}$ in diam. on bracteate peduncles of $\frac{1}{2}$–$1\frac{1}{4}$ in., terminating the branches. Involucral bracts linear-lanceolate, glabrous or nearly so, terminating in an elongated apiculus ciliolate at the very tip. Calyculus short, linear, acute, continuous with the upper bracts of the peduncle. Ligule of the ray-florets $\frac{1}{6}$–$\frac{1}{4}$ in. long. Achenes costate, somewhat hairy.—A. Rich. Fl. Abyss. i. p. 440.

Nile Land. Abyssinia, *Schimper!*

Much resembling some states of *S. inæquidens*, DC. Prodr. vi. 401, from Cape Colony; it may possibly prove to be the same species.

31. **S. Petitianus,** *A. Rich. Fl. Abyss.* i. p. 442. Glabrous shining rampant perennial herb, 2–3 ft. high, corymbosely branched above. Branches terete. Stem-leaves elliptical, acute or subacute, abruptly narrowed at the base into a short flat haft, membranous, of the same brown colour on both sides, obsoletely denticulate, 1–4 by $\frac{1}{4}$–$1\frac{3}{4}$ in. Capitula about 20-flowered, narrowly campanulate, $\frac{3}{8}$–$\frac{1}{2}$ in. long, numerous, on slender bracteolate pedicels of $\frac{1}{3}$–$\frac{2}{3}$ in., in a rather dense corymbose or rounded cyme. Calyculus consisting of 3–5 short lanceolate bracts. Involucral bracts 8–9, linear, pointed at apex, with thinner margins, $\frac{1}{5}$ in. long, subglabrous with ciliolate tips. Florets about 20. Ligule of the ray-florets oval-oblong, $\frac{1}{6}$–$\frac{1}{5}$ in. long, yellow. Achenes costate, scattered with short thick hairs.

Nile Land. Abyssinia, *Q. Dillon & Petit! Schimper!* (In thickets reaching the top of high trees) 7,400 ft. alt., *Hildebrandt!* fide Vatke in Oesterr. Bot. Zeitschrift, 1875, p. 329.

32. **S. clematoides,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 870. A more or less cottony-puberulous climbing perennial wiry herb of several feet. Branches terete, finely striate, glabrescent. Leaves ovate, deeply cordate, acute or acuminate, acutely dentate, rather paler beneath, 1–$3\frac{1}{2}$ in. long; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in., not auriculate. Capitula narrowly campanulate, $\frac{1}{3}$–$\frac{3}{8}$ in. long, on short slender cottony-pubescent pedicels in axillary and terminal rounded dense corymbs. Calyculus consisting of a few short narrowly linear ciliate bracts. Involucral bracts 8-9, broadly linear, puberulous or glabrous, obtuse or subacute, with scarious margins, $\frac{1}{6}$ in. long. Florets about 14, all tubular, yellow, the outer one female, the inner hermaphrodite. Achenes glabrous. —A. Rich. Fl. Abyss. i. p. 442.

Nile Land. Abyssinia, *Schimper! Petit! Roth!* Mount Aper, *Ferret and Galinier.*

33. **S. deltoideus?,** *Less.*; *Syn. Gen. Comp.* p. 392. A puberulous small climbing herb, of several feet, divaricately branched. Branches sulcate-striate, terete. Leaves ovate-lanceolate (or deltoid), broadly hastate, multidentate, 1–3 in. long; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in., auriculate at the base. Capitula (narrowly) campanulate, $\frac{1}{4}$ in. long, on short pedicels, in axillary and terminal dense rounded corymbs. Calyculus consisting of a few short bracts. Involucral bracts broadly linear, (5–)8, subobtuse, $\frac{1}{8}$ in. long, subglabrous. Florets about 16, all tubular, hermaphrodite. Achenes glabrescent.

South Central ?. Muata Manja, alt. 4,000 ft., in shady places by water courses, *Kirk!*

Our specimen differs from the type of *S. deltoideus*, which occurs in many places in Natal and Eastern districts of Cape Colony, by more lanceolate leaves, by about 8 instead of 5 involucral bracts, and by about 16 instead of 5–6 florets in each head; it may not improbably prove to be a distinct species.

34. **S. Tedliei,** *O. & H.* Scandent, herbaceous above. Branches terete, striate, puberulous towards the extremities, glabrescent. Leaves secund, petiolate, ovate, acuminate, repand-angular below, glabrous, membranous, very obtuse or somewhat excavated at the base, about 2 by $1\frac{1}{2}$ in., besides puberulous exauriculate petiole of $\frac{3}{4}$ in. Capitula discoid, at length hemispherical, $\frac{3}{8}$–$\frac{2}{5}$ in. long, on rather short pubescent pedicels in dense lateral and terminal cymes. Involucral bracts narrowly linear-lanceolate acute, about 12, about $\frac{1}{4}$ in. long, glabrate except base. Calyculus scarcely present. Achenes black (in the dry state), glabrous.

Upper Guinea. Ashantee, *Tedlie!* Vernacular name, "Yangkompno." See Bowdich, Mission to Ashantee, p. 372; the pounded leaves are said to be applied to cuts and contusions.

35. **S. Forbesii,** *O. & H.* Scandent with elongated wiry glabrous stem and branches. Leaves elliptical, narrowed at both ends, coarsely dentate, puberulous, $1\frac{1}{2}$–3 in. long; petioles ranging up to $\frac{1}{2}$ in., not auriculate at base. Capitula campanulate, $\frac{5}{8}$ in. long, discoid, on rather short slender and puberulous pedicels in few-headed pedunculate cymes. Calyculus consisting of unequal narrowly linear appressed bracts. Involucral bracts about 12, narrowly linear, acute, glabrous, nearly equalling the florets. Florets numerous. Achenes glabrous.

Mozamb. Distr. Mozambique, *Forbes!*

36. **S. Biafræ,** *O. & H.* A glabrous shining climbing herb, 8 ft. high, with patent mostly unilateral branches. Leaves ovate or oval, mostly hastate, remotely dentate, sometimes pinnately tripartite with one large hastate lobe and two narrower lateral ones, acuminate, 1–$3\frac{1}{2}$ by $\frac{1}{2}$–$1\frac{3}{4}$ in. or larger; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. long, exauriculate (in our specimen). Capitula narrowly campanulate, $\frac{1}{3}$–$\frac{3}{8}$ in. long, on short slender pedicels in dense rounded terminal and subterminal cymes. Calyculus consisting of a few short filiform acute bracts. Involucral bracts 8, linear, acute, $\frac{1}{3}$ in. long. Florets all tubular, hermaphrodite, about 10. Achenes glabrous or very nearly so.—*S. Bojeri*, Hook. f. in Journ. Linn. Soc. Lond. vii. p. 202, non DC.

Upper Guinea. Cameroons Mountains, 2,500–7,500 ft. alt., *Mann!*

37. **S. subscandens,** *Hochst. in Herb. Schimp. Abyss.* iii. n. 1926. A glabrous shining apparently scandent herb, somewhat shrubby at base. Branches striate, sulcate or angular, flagelliform. Leaves pinnatipartite, oval in outline, 1½–4 by 1–2 in. including petiole, ranging up to 1½ in., auriculate at base; lobes usually 3–5 on each side, oblong ovate or obovate, the terminal one the largest, repand or toothed. Capitula narrowly campanulate, ⅓–⅜ in. long, on short slender pedicels, in rounded dense cymes. Calyculus consisting of a few short lanceolate bracts. Involucral bracts 5, broadly linear, ¼–⅓ in. long. Florets about 10–11, all tubular, hermaphrodite. Achenes costate, setulose.—A. Rich. Fl. Abyss. i. p. 434.

Nile Land. Abyssinia, at elevation of 7,400 ft., *Schimper! Roth!*
Mozamb. Distr. Murchison Falls, local name, "Fantra," *Meller!*

38. **S. gabonicus,** *O. & H.* A glabrous shining climbing herb of several feet with slender habit. Leaves ovate or oval, pinnatisect, acute, patent, 1½–4½ by ½–2¼ in. including a petiole of ⅓–1 in. with large auricles at base; lobes 2–5 on each side with a terminal one, linear or sublinear, acute, patent or recurved, entire or repand, ¼–1¼ in., the terminal one erect, ⅔–1½ in. long. Capitula narrowly campanulate, ⅓–⅜ in. long, on short slender bracteolate pedicels, in rounded terminal and subterminal cymes. Calyculus consisting of a few narrow bracts. Involucral bracts 8, linear, acute, ⅓ in. long. Florets all tubular, 10, hermaphrodite. Achenes short, costate, minutely setulose.

Upper Guinea. By River Gaboon, *Mann!*

39. **S. longiflorus,** *O. & H.* An erect glabrous fleshy rigid perennial, shrubby, much-branched, 1½–2 ft. high. Stem and branches angular. Leaves scale-like, distant, subulate, ¼–⅓ in. long. Capitula subcylindrical, 1–1½ in. long, narrow, on stout peduncles of ¼–⅓ in., 2–5 together terminating the branches and short lateral shoots. Calyculus consisting of a few minute scales or obsolete. Involucral bracts 5–6, linear, tapering upwards, striate, ½–¾ in. long. Florets all tubular, hermaphrodite, 5–10, about double the length of the involucre. Achenes costate, subcylindrical, ranging up to ⅓ in. long, setulose between the ribs. Receptacle alveolate, fimbrillate; fimbrillæ caducous, short.—*Kleinia longiflora*, DC. Prodr. vi. p. 337; Harv. Fl. Cap. iii. p. 316.

Nile Land. Abyssinia, *Roth!* (full of a resinous balsamic juice), at elevation of 4,000–7,500 feet.
South Central. Lake Ngami, *Hb. Dublin!* at the junction of the Semokhie with the Shasha Rivers, *Baines!*
Occurs also in the Kalahari region of South Africa.

40. **S. kleinioides,** *O. & H.* Woody, quite glabrous. Branches robust, marked with the prominences at the base of the leaves, crowded in the lower part, distant above. Leaves fleshy, obovate-oblong, quite entire, subobtuse or acute, callous-mucronate, contracted at the quasi-petiolate base. Heads cylindric-obconical, on short thick pedicels,

many together in pedunculate corymbose cymes, with a few bracteoles outside the involucre. Involucral bracts 6–8, linear-oblong, with wide scarious margins and sphacelate pointed tips. Florets 13–22, all tubular, 1½ times the length of the involucre. Achenes striate, appressedly villous. Receptacle ciliate. Style-branches appendiculate. —*Notonia kleinioides*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 151.

Nile Land. Abyssinia, *Schimper!*

The specimen of *Steudner* with 5–6 involucral bracts, red florets only 10, and leafless, quoted by Ascherson in Schweinfurth l. c. p. 246, may belong to *Senecio longiflorus*.

DOUBTFUL AND UNKNOWN SPECIES OF SENECIO.

Senecio flavus, Schultz Bip., i.e. *S. Decaisnei*, D.C., a species closely allied to *S. vulgaris*, Linn., and occurring in the Canary Islands and the East from Algeria to Arabia Felix and Afghanistan, is given in Schweinf. and Aschers. p. 286, as occurring also in Nubia.

Senecio salviifolius, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 160, without description, from Abyssinia, is unknown to us.

Senecio sp., *incrassato*, Guss. aff., Schultz Bip. in Schweinf. et Aschers. p. 286, name only, from Nubia, is unknown to us.

84. **WERNERIA**, H. B. K.; Benth. et Hook. f. Gen. Pl. ii. p. 451.

Characters of *Senecio*, but 1-seriate bracts of the involucre more or less coherent at base.—Low tufted acaulescent herbs with radical leaves and yellow- rose- or white-rayed large or medium-sized heads.

A considerable genus of the South American Andes with the following (and perhaps another, Himalayan) outlier.

1. **W. africana**, *O. & H.* Dwarf cæspitose perennial herb, 2–3 in. high. Rootstock thick. Stem very short, covered below by imbricated bases of the leaves, pubescent above. Leaves linear, elongated, obtuse, glabrous or nearly so, sessile, dilating at the base and subamplexicaul, entire or indistinctly toothed, ½–3 in. long, the uppermost bract-like, smaller. Capitula solitary, terminal, subhemispherical, ½–¾ in. diameter, on peduncles ranging up to 1½ in. Involucral bracts linear-lanceolate, erect, with scarious or paler margins, ciliolate-tufted or obtuse at the tip, connate from base ¼–⅓ way up. Ligule of the ray-florets ¼–⅜ in. long, revolute. Achenes glabrous. — *Senecio nanus*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 1265. A. Rich. Fl. Abyss. i. p. 443, non *Werneria nana*, C.B. Clarke Comp. Ind. p. 210 (1876). *S. amœnus*, Schultz Bip. l. c. ii. 1307.

Nile Land. Abyssinia, *Schimper! Rüppell* (β. *denticulatus*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 159).

85. **EURYOPS**, Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 452.

Capitula heterogamous, radiate; ray-florets 1-seriate, ♀. Involucre hemispherical or campanulate; bracts 1-seriate or nearly so, equal, distinctly connate below, imbricate. Receptacle foveolate, toothed (or naked). Style-branches obtuse, penicillate. Achenes with a caducous

rough or barbellate pappus.—Low shrubs with alternate often crowded fleshy entire or incised leaves and pedunculate axillary yellow capitula.

A considerable genus of the Cape region.

1. **E. pinifolius,** *A. Rich. Fl. Abyss.* i. p. 445, t. 60. A procumbent glabrous undershrub; branches woody, terete, densely leafy or closely marked with the scars and pulvini of fallen leaves. Leaves linear, obtuse, fleshy, subterete, $\frac{1}{4}$–1 in. long, sessile. Peduncles terete, rigid, solitary in the upper axils, $1\frac{1}{4}$–$2\frac{1}{2}$ in., corymbosely arranged, straw-coloured. Involucre hemispherical, $\frac{1}{3}$–$\frac{2}{5}$ in. diameter, composed of about 12 ovate-oblong bracts, connate nearly half way. Capitula solitary, many-flowered; marginal florets ligulate; ligules oblong 4–5-nerved, $\frac{3}{8}$ in. long. Disk-florets about equalling the involucre. Achenes glabrous.

Nile Land. Abyssinia, Oudgerate, *Petit!* Somali-land, alt. 6,000 feet, *Hildebrandt!*

E. arabicus, Steud. (*Caræa pinifolia*, Hochst.) in Herb. Schimp. Arab. n. 852, much resembles our species but perhaps differs by shorter peduncles and fewer involucral bracts.

86. OTHONNA, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 453.

Capitula (heterogamous, radiate or) ray-florets wanting. Involucre campanulate or oblong (or hemispherical); bracts 1-seriate, equal, more or less connate at the base or nearly quite free, margins imbricate; calyculus 0. Style in 1 or more of the outer florets 2-fid; branches obtuse or truncate, penicillate, of the rest of the florets undivided. Achenes terete with a copious white pappus.—Shrubby or herbaceous with alternate more or less fleshy entire or variously toothed or dissected leaves, and terminal usually yellow solitary or cymose capitula.

A considerable South African genus.

1. **O. Bainesii,** *O. & H.* Shrubby, glabrous or nearly so. Branches sulcate (in the dry state). Leaves elliptical, rounded at apex, somewhat narrowed to the sessile 3- or 5-nerved base, fleshy, coriaceous when dry, $\frac{1}{2}$–2 in. long, about twice the length of the internodes; veins inconspicuous except base. Heads campanulate-oblong, $\frac{2}{3}$ to nearly 1 in. long, on bracteate peduncles, terminal and subterminal. Involucral bracts oblong, about 5, subconnate at base, nearly $\frac{1}{2}$ in. long; tip ovate, subobtuse, obsoletely ciliolate. Florets all tubular; corolla exceeding the involucre and pappus. Achenes costate, very shortly hairy.

South Central? South African Gold Fields, *Baines!*

87. TRIPTERIS, Less.; Benth. et Hook. f. Gen. Pl. ii. 455.

Capitula heterogamous, radiate; ray-florets ligulate ♀, disk-florets tubular, sterile. Involucre campanulate or spreading; bracts sub-1-seriate, linear or subulate above with scarious margins. Anther-base produced contiguous appendices connate. "Style of sterile florets

undivided." Achenes in our species conspicuously alate; pappus 0.—Herbs or shrubs with alternate or opposite entire or toothed often glandular or scabrid leaves, and solitary or loosely panicled pedunculate yellow purplish (or blue?) capitula.

A genus of 25–30 species, chiefly belonging to the Cape.

Leaves all alternate. Heads rather numerous . . . . . 1. *T. Vaillantii.*
Lower leaves opposite. Heads few.
Perennial. Leaves all sessile or subsessile . . . . . 2. *T. monocephala.*
Annual. Lower leaves on slender petioles. . . . . 3. *T. Lordii.*

Calendula arvensis, Linn. was found by Schweinfurth in the Great Oasis.

Tripteris cuneifolia and *T. Rueppellii*, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 287, names only, from Abyssinia, are unknown to us.

1. **T. Vaillantii,** *Decaisne in Ann. Sc. Nat. ser.* ii. vol. ii. p. 260 (1834). Scabrous erect stiff herb, 1–2 ft. high or more. Branches striate, leafy below the inflorescence. Leaves all alternate, varying from linear to narrowly elliptical, dentate or subpinnatifid, 1–4½ in. long, the upper ones sessile and semiamplexicaul, the lower gradually narrowed into a short petiole. Capitula hemispherical, about ⅜ in. diam. in flower, on pedicels of ¾–7 in. in a lax open corymb. Involucral bracts 9–11, ⅕ in. long, narrowly linear with a subulate tip, reflexed in old fruit. Ligule of the ray-flowers sometimes exceeding ½ in.—A. Rich. Fl. Abyss. i. p. 446; *T. cheiranthifolia*, Schultz Bip. in Herb. Schimp. Abyss. i. n. 345 & iii. n. 1480.

Nile Land. Abyssinia, *Schimper! Parkyns! Petit! Q. Dillon, Roth!* alt. 5,700 ft.; Somali-land, alt. 6,000 ft., *Hildebrandt!*

Occurs also at Mount Sinai.

2. **T. monocephala,** *O. & H.* Erect subscabrid perennial, about 2 ft. high. Stems simple or but little branched, terete. Lower leaves opposite, narrowly elliptical, sessile or subsessile, narrowed at both ends, entire or distantly toothed, 1½–2 by ⅕–½; upper leaves sessile, slightly amplexicaul, rather smaller, alternate. Capitula hemispherical, scarcely ½ in. diam. in flower, solitary, on peduncles of 6–12 in., which bear one or more narrow alternate bracts rather smaller than the leaves. Involucral bracts linear-subulate, about ⅕ in. long.

Mozamb. Distr. Manganja Hills, *Meller!* Zambesia, *Stewart!*

3. **T. Lordii,** *O. & H.* A decumbent or ascending scabrid-pubescent annual, 4–6 in. high, rather leafy below, but little branched. Lower leaves opposite, petiolate, oval or narrowly elliptical, distantly repand-denticulate, obtuse or apiculate, narrowed towards the base, 1½–2½ in. long including the petiole of ¼–½ in.; upper leaves alternate narrower sessile or shortly petiolate. Capitula campanulate in flower, ¼ in. long, on slender pedicels of 1–2½ in., solitary or few in a lax cyme. Involucral bracts narrowly lanceolate, ⅕ in. long, acute. Ligule of the ray-florets linear, about ⅙ in. long.

Nile Land. Upper Nubia, Hor Tamanib, *J. K. Lord!* (with label stating that the flower is blue).

88. **OSTEOSPERMUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 455.

Capitula heterogamous, radiate; ray-florets female fertile in one row; disk-florets hermaphrodite sterile. Involucre campanulate in flower, hemispherical in fruit; bracts in about 2 rows, subequal. Receptacle slightly convex, nearly flat, small, naked. Corollas of the ray ligulate; ligule spreading, oval-oblong, tridentate or subentire at the tip; corollas of the disk regular, tubular, funnel-shaped, shortly 5-cleft. Anthers appendaged at the apex, obtuse or mucronulate, not tailed at the base. Style of the ray-florets bidentate at the tip, of the disk-florets ending in a slightly enlarged entire globose stigmatic apex. Achenes of the ray at length thick, turbinate, somewhat incurved, hard, subterete, obscurely trigonous and somewhat ribbed. Pappus 0 or a mere ring at the top of the achenes.—Undershrubs or rigid herbs with alternate (rarely opposite) leaves and yellow flowers.

A genus of about 38 species mostly confined to the Cape or Natal.

1. **O. muricatum,** *E. Mey. ex DC. Prodr.* vi. p. 464. Somewhat shrubby, 6–12 in. high. Branches pale and glabrescent below, glandular-scabrid and leafy above. Leaves linear or linear-oblong, pinnatifidly toothed, ascending, glandular-scabrid, sessile, rather clasping, not auriculate at the base, $\frac{1}{2}$–1 in. long, gradually shorter and more entire upwards, teeth and apex apiculate. Capitula solitary, terminating the branches which are leafy nearly to the top. Involucre $\frac{1}{3}$ in. long; bracts about 8–9, lanceolate, acute, glandular-puberulous and green on the back, scarious-ciliate on the margins. Ray-florets 10–12, ligule $\frac{1}{4}$ in. long; disk-florets rather more numerous. Corolla-tube glandular below. Achenes $\frac{3}{16}$ in. long, glabrous or puberulous towards the top. —Harv. et Sond. Fl. Cap. iii. p. 441 (var. a. *asperum*).

Nile Land. Somali-land, mountainous region, on dry limestone, altitude 6,000 ft., *Hildebrandt!*

Occurs also in the Cape Flora and Natal.

89. **URSINIA,** Gærtn.; Benth. et Hook. f. Gen. Pl. ii. p. 456.

Capitula heterogamous radiate; ray-florets 1-seriate ligulate neuter. Involucre hemispherical of ∞-seriate imbricate successively longer bracts, especially the inner with scarious margins. Paleæ of receptacle equalling and enfolding the florets. Anther-base unappendaged. Style-branches truncate. Achenes subterete (10-costate or) with 5 longitudinal grooves; pappus duplex, outer of 5 broadly obovate, opaque, white, contorted scales equalling the achene, inner paleæ 5 subulate.—Herbs with alternate toothed or 1–2-pinnatipartite leaves and terminal pedunculate capitula with a yellow disk.

A large genus of the Cape.

1. **U. annua,** *Less. in Linnæa* vi. p. 165, *in notâ* (1831). Glabrate annual, ranging up to 1 ft. high, erect or diffuse, branched or subsimple. Leaves pinnati- or bipinnati-partite, petiolate, ranging up to 2½ in. long, somewhat fleshy; segments linear-filiform, (in our speci-

mens) with acute apical callus. Capitula subglobose, $\frac{1}{3}$–$\frac{2}{3}$ in. diam., solitary, terminal, on naked peduncles of 1–3 in. exceeding the leaves. Outer involucral bracts ovate, obtuse or subacute, mostly with dark edges.—Harv. et Sond. Fl. Cap. iii. p. 152 (*U. nana* and *U. indecora*, DC. Prodr. v. p. 690); *U. abyssinica*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 1238; A. Rich. Fl. Abyss. i. p. 417.

Nile Land. Abyssinia, *Schimper! Roth! Q. Dillon! Petit!*
Occurs also in both Eastern and Western districts of Cape Colony, etc.

90. **LANDTIA,** Less.; Benth. et Hook. f. Gen. Pl. ii. p. 457.

Capitula heterogamous radiate, ray-florets ligulate ♀. Involucre campanulate, bracts loosely pluriseriate, the inner scarious above. Receptacle alveolate with or without fimbrillæ. Style ultimately 2-lobulate. Achenes obovoid or turbinate, glabrous, angled or costate on the face (and transversely rugose in *L. Schimperi*), pappus minute of 1-seriate squamellæ.—Acaulescent herbs with entire or pinnatifid radical leaves and sessile or shortly peduncled yellow capitula.

A small genus of Tropical and Southern Africa.

Leaves undivided. Corolla-tube-glabrous. Achenes smooth. Receptacle naked	1. *L. Rüppellii.*
Leaves shortly pinnatifid. Corolla-tube cottony. Achenes transversely wrinkled. Receptacle fimbrillate	2. *L. Schimperi.*

1. **L. Rüppellii,** *Benth. et Hook. f. Gen. Pl.* ii. p. 457. Rootstock thick with numerous thick elongated fibres, not creeping. Leaves radical, oval, numerous, rounded at the apex, gradually or abruptly narrowed at the base, coarsely or repandly crenate-dentate, petiolate, rather fleshy, coriaceous when dry, nearly glabrous above, shortly white-tomentose beneath, $1\frac{1}{4}$–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{2}$ in., besides dilated petiole of $1\frac{1}{4}$–$2\frac{1}{2}$ in. Capitula turbinate-hemispherical, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., solitary, on peduncles of 1–3 in. which are thickened towards the apex. Involucral bracts linear-oblong; outer ones somewhat woolly. Ligule of the ray-florets linear-oblong, $\frac{5}{8}$ by $\frac{1}{8}$ in. Corolla-tube of the disk-florets glabrous. Achenes obovoid, $\frac{1}{12}$ in. long, smooth. Style cylindrical. Receptacle flat, naked.—*Schnittspahnia Rüppellii*, Schultz Bip. in Flora, 1842, p. 439; A. Rich. Fl. Abyss. i. p. 446.

Nile Land. Abyssinia, *Schimper! Rüppell!*

2. **L. Schimperi,** *Benth. et Hook. f. Gen. Pl.* ii. p. 457. Rootstock elongated, creeping. Leaves radical oblanceolate, numerous, obtuse or mucronate, attenuate at the base into the petiole, sinuous-pinnatifid or subentire, shortly silvery-velvety or -cottony beneath, glabrous or obsoletely velvety above, 1–6 by $\frac{1}{2}$–$1\frac{5}{8}$ in. besides petiole of $\frac{1}{2}$–4 in.; lobes mostly ovate obtuse and toothed, terminal one largest. Capitula hemispherical, about $\frac{1}{2}$ in. diam., on peduncles of less than 1 in., solitary. Involucral bracts oblong, the outer ones cottony. Ligule of the ray-florets oval-oblong, about $\frac{3}{8}$ in. long. Corolla-tube cottony. Achenes glabrous, obovoid, $\frac{1}{8}$ in. long, transversely rugose, costate. Style thickened near the apex and with a ciliolate ring near the base.

Receptacle alveolate, fimbrillate with a few rather long subulate paleæ. —*Schnittspahnia Schimperi*, Schultz Bip. in Linnæa, 1842, p. 439; *Ubiæa Schimperi*, J. Gay ex A. Rich. Fl. Abyss. i. p. 447.

Nile Land. Abyssinia, *Schimper! Petit! Roth!*

91. **HAPLOCARPHA,** Less.; Benth. et Hook. f. Gen. Pl. ii. p. 457.

Characters of *Landtia*; our species differs in long scape and the achenes with a conspicuous paleaceous pappus, the paleæ subulate or aristate, and the ovary densely villous below.

Exclusively South African.

1. **H. scaposa,** *Harv. Fl. Cap.* iii. p. 465. Leaves elliptical or somewhat spathulate, rounded at apex, white cottony beneath, obsoletely so and slightly scabrid above, repand-dentate, about 3 in. long, narrowed at base into petiole. Scape about 10 in. long, white-cottony. Capitula solitary, scarcely 1 in. diam. Involucral scales obtuse, in several rows, thinly cottony. Achenes glabrous, with a basal tuft of pilose-silky hairs that exceeds them, crowned with acute subulate scales which in our specimen are brown. Flowers yellow.—*H. Thunbergii*, DC. Prodr. vi. p. 494, non Less. ex Harv.

Mozamb. Distr. Near Sotschi, *Kirk!* alt. 3,000 ft.
Occurs also in Eastern districts of Cape Colony, Kaffraria, Natal, Transvaal, etc.

92. **ARCTOTIS,** Linn.; Benth et Hook. f. Gen. Pl. ii. p. 458.

Capitula heterogamous radiate; ray-florets ligulate ♀. Involucre hemispherical of pluri- or multiseriate scarious-tipped successively longer bracts. Style-branches connate to or near to the apex. Achenes villous or with tufted basal hairs, back 3–5-costate with the lateral ridges winged, the wings incurved so as nearly to meet the median ridge, thus enclosing two dorsal cavities. Pappus 2-seriate, inner paleæ contorted, outer smaller or all minute.—Acaulescent or caulescent herbs, more or less hoary or lanate; leaves entire or pinnatifid. Capitula solitary on long or short peduncles; disk orange yellow or purplish; ray same or varying rose or white.

Another Cape genus with the following exception.

1. **A. pygmæa,** *A. Rich. Fl. Abyss.* i. p. 448. Stemless, scarcely 1 in. high. Leaves radical, oblong or elliptical, pinnatifid, attenuate at the base into a short petiole $\frac{3}{8}$–$\frac{5}{8}$ in. long, scarcely pubescent above, white tomentose beneath, rather fleshy. Capitula rather small, solitary, shortly pedunculate, falling short of the leaves. Outer involucral bracts lanceolate, foliaceous, subtomentose. Corolla-tube of the disk-florets cottony. Achenes somewhat compressed, subulate with denticulate wings. Pappus-scales 8, oblong, pellucid, attenuate, dissected-dentate.

Nile Land. Abyssinia, Quodgerate, *Petit!*
The specimens seen by us, kindly lent by Count Franqueville from the Richard Herbarium, were too imperfect for us to see the achenes or flowers.

93. **GAZANIA,** Br. (vix Gærtn.); Benth. et Hook. f. Gen. Pl. ii. p. 459.

Capitula heterogamous radiate, ray-florets 1-seriate ligulate "neuter." Involucre cylindrical or urceolate, bracts pauci- (or pluri-) seriate imbricate coherent $\frac{2}{3}$ their length or more; apices free acute. Receptacle shortly alveolate. Anther-base sagittate. Style-branches linear rather acute. Achenes clothed with long rather rigid and elastic hairs; pappus 1-seriate closely investing the corolla-tube, in our species apparently of ∞-setæ variously confluent into a sheath below.—Diffuse or acaulescent herbs with radical or alternate cauline entire or pinnatifid leaves and rather large yellow or orange or purple-rayed pedunculate capitula.

A considerable genus of the Cape.

Gazania, sp. ? Oliv. in Trans. Linn. Soc. Lond. **xxix.** p. 100, i. e. *Cullumia*, No. 1, T. Thoms. in Speke, Journ., App. p. 638, does not admit of a good description.

1. **G. serrulata,** *DC. Prodr.* vi. p. 475. A nearly glabrous dwarf perennial herb with short thick woody root-stock; height 3–4 in. Leaves radical numerous, shortly white-tomentose beneath, linear, apiculate, with lanceolate sessile sheathing base, $1\frac{1}{2}$–3 in. long, margins revolute, obsoletely serrulate. Capitula cylindric-urceolate, $\frac{1}{2}$ in. long (exclusive of the rays), solitary, on peduncles of $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, falling rather short of the leaves. Involucral bracts connate more than half way, subglabrous; free portions ovate-lanceolate, acute, numerous, in about 2 rows, somewhat recurved-patent, sometimes serrulate-ciliate and with narrowly scarious edges. Ligule of the ray-florets (about 15) linear, about $\frac{1}{2}$ in. long.—Harv. et Sond. Fl. Cap. iii. p. 475.

Mozamb. Distr. In bogs, Sotshi, at elevation of 3000 ft., *Kirk!*

Occurs also in the district of Albert and in Natal.

We have not seen the type-specimen of this species and follow Dr. Harvey's nomenclature.

94. **BERKHEYA,** Ehrh.; Benth. et Hook. f. Gen. Pl. ii. p. 460.

Capitula heterogamous radiate, ray-florets 1-seriate ligulate neuter. Involucre broad, bracts ∞-seriate, loosely imbricate, more or less connate at base, coarsely setose- or spinulose-ciliate or spinescent. Receptacle deeply alveolate, cells sheathing the achenes, often with fimbriate margins. Anther-base sagittate. Style-branches narrow-linear rather obtuse. Achenes turbinate, pappus of numerous biseriate fimbriate or denticulate squamæ.—Herbs or shrubs, often thistle-like, with alternate (or opposite) setose-dentate, pinnatifid or entire leaves usually cottony beneath and rather large solitary or subcorymbose yellow capitula.

A large South African genus.

Paleæ of the pappus fimbriate.

Leaves narrowly linear, acute	1. *B. Zeyheri.*
Leaves spathulate or narrowly elliptical, obtuse, apiculate	2. *B. gorterioides.*
Paleæ of the pappus obtuse, denticulate at the rounded tip	3. *B. Spekeana.*

1. **B.** (Stobæa) **Zeyheri,** *Sond. et Harv. ex Harv. et Sond. Fl. Cap.* iii. p. 496; non *Less.* Branches ascending or erect, thinly cottony; the barren branches leafy throughout; flowering ones leafy below, nearly naked above, 1–1½ ft. high. Leaves narrow-linear, tapering towards the tip, sessile, bristle-pointed, setosely ciliate, white-tomentose beneath, ½–2 in. long, margins much revolute. Capitula solitary, terminal, subglobose, (including the rays) about 1½ in. diameter. Involucral scales reflexed during flowering, linear-subulate, rather exceeding the ligules, setose-ciliate, cottony beneath. Achenes silky; pappus twice as long as the achene of many biseriate fimbriate paleæ.

Mozamb. Distr. Near Kankanje, *Kirk!*
Occurs also south of the tropic.

2. **B. gorterioides,** *O. & H.* A scabrous-asperous diffuse perennial. Branches pale, hispid. Leaves spathulate or narrowly elliptical, very scabrous and hispid above, white-tomentose beneath, attenuate at the base, shortly or scarcely petiolate, ¾–1¾ in. long, apex apiculate with a rigid bristle, margins revolute. Capitula solitary subsessile, subglobose, ½ in. long (exclusive of the rays). Involucral bracts linear-subulate bristly hispid setaceous-ciliate, terminating in a long serrulate bristle; outer ones filiform. Ligule of the ray-florets about 15, linear, ⅔–¾ in. long. Achenes densely pilose-villous. Pappus paleaceous, hyaline, fimbriate.

South Central ?. "South Tropical Africa," *Baines!*

3. **B. Spekeana,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 100, t. 66. A robust erect branched prickly herb, some feet high. Branches striate puberulous above, not angled, leafy to the top. Leaves linear-oblong, sessile, semiamplexicaul, remotely toothed, setosely apiculate at tip, spinous-hispid above, white-tomentose beneath, 1–6 in. long; teeth setosely apiculate. Capitula subglobose, solitary or a few near together, shortly pedunculate, about 1 in. diameter (exclusive of the rays). Involucral bracts numerous lax, linear or linear-subulate, spinous-acuminate, about ¾ in. long. Ligule of the ray-florets about 1 in. long, linear. Achenes somewhat hairy. Paleæ of the pappus about 15–20, in several rows, denticulate-ciliolate at the obtuse round tip.—*Oullumia*, n. 2, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Unyoro, *Speke and Grant!*

95. **PLATYCARPHA,** Less.; Benth. et Hook. f. Gen. Pl. ii. p. 462.

Capitula homogamous few (3 or more) -flowered, collected in a broad dense depressed-hemispherical head. Involucral scales glumaceous, about 12, nearly equal, oblong acuminate. Receptacle very narrow naked (or with narrow paleæ between the outer florets). Corolla infundibuliform above, 5-lobed. Style-branches short ovate-oblong rather obtuse. Achene (very transversely rugulose) with 5–8–10 2-seriate paleæ, linear-lanceolate or the inner -subulate.—

Acaulescent herbs with pinnatifid leaves and the densely congested inflorescence sometimes 2–4 in. diameter immediately over the root-stock.

A small genus restricted to South Africa.

A second species with more spinose involucres occurs in the Cape Flora.

1. **P. carlinoides,** *O. & H.* Leaves numerous, spreading in a stellate manner, oblanceolate, deeply pinnatifid, attenuate into a flat broad petiole which dilates at base forming an involucre to the clusters of heads, rugulose and puberulous above, shortly white-tomentose beneath, 3–6 by 1–1½ in.; lobes apiculate-denticulate, ovate or rounded. Capitula oblong, nearly ½ in. long by $\frac{1}{10}$ in. thick, few (about 4)-flowered, very numerous, collected into a dense cluster of 2½–3 in. diameter. Involucral scales about 10–12, glabrous, sublinear, acuminate. Achenes glabrous, transversely wrinkled. Pappus paleaceous; paleæ about 12, unequal, ciliolate-fimbrillate.

South Central?. 23° S. Lat., *Chapman and Baines!*

96. ECHINOPS, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 462.

Capitula 1-flowered usually numerous and densely aggregated in globose heads: common involucre usually concealed, of small or setiform reflexed scales. Partial involucres of numerous rigid imbricate pointed or spinose bracts the outer necessarily shorter and usually passing gradually or abruptly into slender setæ; inner bracts sometimes fasciculate-spinulose near the apex. Corolla regular. Achenes elongate subterete; pappus of nearly free or connate more or less paleaceous setæ.—Spinose thistle-like herbs, frequently more or less hoary-tomentose, with alternate pinnati- or bipinnatisect spinescent leaves and solitary terminal globose compound heads, varying to 3–4 in. diameter.

A considerable genus of the Mediterranean region and temperate Asia, wanting south of the equator.

Middle scales of the partial involucre simply acuminate or cuspidate.
- Scales of the partial involucre 20–25 in many rows. Outer setaceous bracts subcompressed, tawny.
  - Leaves linear . . . . . 1. *E. longifolius.*
  - Leaves ovate or elliptical . . . . . 2. *E. amplexicaulis.*
- Scales of the partial involucre about 17–20, in fewer rows. Outer setaceous bracts nearly white, silky.
  - Some of the capitula with long projecting spines . . 3. *E. spinosus.*
  - None of the capitula with long spines produced beyond the rest of the cluster.
    - Glandular-pubescent . . . . . 4. *E. macrochætus.*
    - Hispid . . . . . 5. *E. hispidus.*

Middle scales of the partial involucre fasciculate-spinous.
- Leaves glabrate above. Outer setaceous bracts nearly equalling the inner involucral bracts . . . . . 6. *E. longisetus.*
- Leaves hispid above. Outer setaceous bracts scarcely half equalling the inner involucral bracts.
  - Stem tall. Leaves pinnatifid . . . . . 7. *E. giganteus.*
  - Stem very short. Leaves bipinnatisect . . . . . 8. *E. chamæcephalus.*

1. **E. longifolius,** *A. Rich. Fl. Abyss.* i. 452, t. 61. Erect perennial, about 2 ft. high, branched from the crown of the root. Stems simple, terete, glabrate or cottony, leafy. Leaves linear, sessile, amplexicaul, auriculate, closely spinously duplicate-serrate, glabrous and shining above, white-tomentose beneath, acute, spinous-pointed, coriaceous, 6–12 by $\frac{1}{2}$–$1\frac{1}{2}$ in. Heads about $\frac{2}{3}$ in. long in flower, 1 in. in fruit, numerous, crowded into a globose head of $1\frac{1}{2}$–3 in. diameter. Flower purple. Outer setaceous bracts about $\frac{1}{2}$ in. long in fruit, compressed, tawny. Inner involucral bracts in many rows, serrulate-ciliate, lanceolate or spathulate, subulate at the tip, about 20–25; the innermost connate nearly half way and ranging up to nearly 1 in. long. Achenes densely pilose-setose at least towards the apex which overtop the pappus. Pappus of many contiguous ciliate narrow scales which are connate at the base.—*E. serratifolius*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 941.

Upper Guinea. Niger, *Baikie!* Mora, *E. Vogel!* (flowers blue).
Nile Land. Abyssinia, *Schimper! Q. Dillon and Petit!* alt. 8000 ft.; Gallabat, *Schweinfurth!* Madi, *Speke and Grant!*

2. **E. amplexicaulis,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 101, t. 67. Erect, 4 ft. high or more. Stem leafy, sulcate, white-cottony above. Upper leaves ovate or elliptical, acute or obtuse, pinnately lobed, scabrous above, shortly white-tomentose beneath, 3–9 by 2–6 in.; lobes spinous-dentate, from a broad base terminating in a spinous point. Heads 1–$1\frac{1}{2}$ in. long, very numerous, in a dense globose cluster of 3–4 in. diameter. Outer setaceous bracts not or scarcely exceeding $\frac{1}{2}$ in., tawny. Inner involucral bracts 20–25 glabrous, ciliate-spinulose, linear-lanceolate or subulate, acuminate at tip, the innermost connate nearly half way. Achenes appressedly pilose. Pappus of numerous contiguous narrow ciliolate bracts connate at base. Flowers pink.—*Echinops*, no. 1, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Usui, *Speke and Grant!* Bongo-land, *Schweinfurth!*

3. **E. spinosus,** *Linn. Mant.* i. p. 119. Stem erect, branched, 3–5 ft. high, terete, more or less white-cottony, not glandular. Stem-leaves sessile, ovate, pinnatisect, 2–8 in. long; segments spinous-incised or undivided. Heads about $\frac{3}{4}$ in. long or including the long spines that project from some of them about $1\frac{3}{8}$ in. long, crowded in clusters of 3–4 in. diameter. Outer setaceous bracts silky, $\frac{1}{4}$–$\frac{1}{3}$ in. long, nearly white. Inner involucral bracts about 17, narrowly spathulate or sub-linear, acuminate; sometimes one or two project far beyond the others in a strong spine; the innermost connate at least half way. Achenes narrowly turbinate, densely setulose (in the spine-bearing heads). Pappus of setaceous ciliate scales connate nearly the whole way up.—A. Rich. Fl. Abyss. i. p. 450.

Nile Land. Abyssinia, Tigré, *Q. Dillon!* (fide Richard), *Schimper!* a. 1863, n. 951.

Extends to Egypt and Arabia.
The description is taken from Egyptian specimens.

4. **E. macrochætus,** *Fresen. in Mus. Senckenb.* iii. p. 69. Erect, branched, 3–5 ft. high. Branches glandular-pubescent above, terete, striate. Leaves sessile, semi-amplexicaul, oblanceolate or elliptical, acute at both ends, glandular-puberulous above, white-tomentose beneath, ranging up to 8 in. or more, deeply pinnatifid in the upper part, pinnatipartite in the lower part, segments ovate or lanceolate, pinnately incise or dentate, the teeth and apex terminating in a long spinous point. Heads about $\frac{2}{3}$ in. long, comparatively few, crowded in clusters of about $1\frac{1}{2}$ in. diameter. Outer setaceous bracts very numerous, silky, some about $\frac{1}{2}$ in. long, nearly white. Inner involucral bracts spathulate or sublinear, apiculate, about 18; the innermost connate into a tube more than half way up. Achenes densely setulose, obovoid. Pappus consisting of equal adjacent setaceous ciliate scales as long as the uppermost hairs on the achenes, connate at base into a shallow cup.—A. Rich. Fl. Abyss. i. p. 451.

Nile Land. Abyssinia, *Rüppell, Schimper! Q. Dillon;* Soturba, *Schweinfurth.*

5. **E. hispidus,** *Fresen. in Mus. Senckenb.* iii. p. 68. Stem branched, white-tomentose, densely hispid as well as the nerves of the leaves with hairs $\frac{1}{4}$ in. long. Leaves pinnatipartite, strigose-scabrid above, white-tomentose beneath, segments pinnatifid or unequally trifid from the base only, lobes linear-lanceolate revolute at the margin, terminating in a long pungent spine. Heads $1\frac{1}{4}$ in. long in clusters of 3 in. diameter. Outer setaceous bracts reaching more than half way up the involucre. Inner involucral bracts glabrous on the back, setose-ciliate, the innermost connate half way. Pappus of unequal ciliate setaceous scales connate at the base.—A. Rich. Fl. Abyss. i. p. 452.

Nile Land. Abyssinia, *Rüppell.*
The description is taken from Fresenius.

6. **E. longisetus,** *A. Rich. Fl. Abyss.* i. p. 450. Stem erect 6–8 ft. high, puberulous and ribbed above. Upper leaves narrowly elliptical or oblanceolate, pinnatipartite, glabrate above, shortly white-tomentose below, about 9 by 3 in., lobes from a broad base terminating in long stout spinous points, the lower lobes smaller and less approximated. Heads about $1\frac{1}{2}$ in. long (in fruit), very numerous, crowded into a globose head of 4 in. diameter. Outer setaceous bracts long, some nearly reaching the top of the head. Inner involucral bracts about 20, fasciculate-spinous at the tip except the 5 innermost ones which are connate below. Achenes obovoid, pilose. Pappus of approximated narrow ciliate scales rather longer than the hairs on the achenes, connate below.

Nile Land. Abyssinia, Choa, *Petit!*

7. **E. giganteus,** *A. Rich. Fl. Abyss.* i. p. 449. Stem erect, branched, 6–16 ft. high, branches more or less cottony above, striate or ribbed. Upper leaves obovate, deeply pinnatifid, sparingly strigose-hispid above, whitish-tomentose beneath, about 12 by 6 in, sessile or

subsessile, lobes mostly lanceolate deeply toothed, teeth terminating in long spinous points; uppermost leaves elliptical, deeply toothed, smaller. Heads (in fruit) ranging up to $1\frac{1}{2}$ in. long, numerous, in a globose head up to about $3\frac{1}{2}$ in. diam. Outer setaceous bracts not exceeding $\frac{3}{8}$ in. Inner involucral bracts about 15, lanceolate or spathulate, many fasciculate-spinous from a knot near the tip; the innermost bracts connate. Achenes glabrescent near the apex. Pappus of numerous contiguous ciliate narrow unequal scales, connate below into a short tube.

Nile Land. Abyssinia, Kouaieta and Semiène, *Q. Dillon!*

8. **E. chamæcephalus,** *Hochst. in Herb. Schimp. Abyss.* ii. n. 914. Stem 6–8 in. high or very short, simple or branched at the crown of the root, terete, leafy. Leaves bipinnatisect, obovate, setose-hispid on the short dilated petiole and stout rachis, as well as the peduncles, strigose-hispid above, white-tomentose beneath, ranging up to about a foot long, primary lobes numerous, with few linear tapering segments terminating in a strong spinous point, the terminal segment being the longest; margins much revolute. Heads $\frac{3}{4}$–$1\frac{1}{4}$ in. long, very numerous, crowded into a subglobose or spheroidal cluster $1\frac{1}{2}$–$2\frac{1}{2}$ in. thick, on a peduncle ranging from 1 in. to nearly a foot long. Outer setaceous bracts silky, about $\frac{1}{3}$–$\frac{1}{2}$ in. long. Inner involucral bracts spathulate or linear, about 16, more or less apiculate, some fasciculate-spinous at the tip; the innermost connate more than half way. Achenes appressedly setulose. Pappus of many adjacent unequal setaceous ciliate scales, which overtop the hairs on the achene and are connate at base into a short tube.—A. Rich. Fl. Abyss. i. p. 448.

Nile Land. Abyssinia, *Schimper!*

97. CARDUUS, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 467.

Capitula heterogamous, florets equal and hermaphrodite (or all 1-sexual in dicœcious species). Involucre globose or ovoid, of numerous ∞-seriate imbricate more or less spinescent bracts. Receptacle densely setose. Pappus of numerous pauci- or multiseriate simple serrulate or barbellate setæ, cohering at the base in a narrow annulus, at length separating from the achene.—Erect or more rarely acaulescent herbs with alternate often decurrent usually spinescent pinnately lobed or sinuate leaves, and terminal solitary or congested often large purple rose or white capitula.

A large genus chiefly of the N. temperate zone of the Old World.

Stem tall. Involucral bracts with spreading spinous tips 1. *C. leptacanthus.*
Acaulescent. Involucral bracts erect.
  Spinous tips of involucral bracts rather long . . . . 2. *C. chamæcephalus.*
  Spinous tips of involucral bracts very short . . . . 3. *C. Schimperi.*

1. **C. leptacanthus,** *Fresen. in Mus. Senckenb.* iii. p. 70 (1839). Stem erect, branched or simple, $2\frac{1}{2}$–12 ft. high, terete, striate, puberulous, towards the apex with spinous usually interrupted wings. Lower leaves on long petioles; upper leaves elliptical or lanceolate, narrowed

at both ends, sessile, ranging up to in fine specimens 18 in. long, glabrescent above, puberulous beneath, pinnatisect or deeply pinnatifid; segments ovate or lanceolate, incise-dentate, teeth and apex spinous-pointed. Capitula oblong, $\frac{3}{4}$–1 in. long, about 30-flowered, on very short pedicels crowded many together into dense globose cymes of 2–3 in. diam. Involucral bracts narrowly oblong, terminating in a long spreading spine with subulate base, the innermost wider with scarious ciliate margins, about equalling the purple or violet florets.—*C. abyssinicus*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 910; A. Rich. Fl. Abyss. i. p. 455.

Nile Land. Abyssinia, *Rüppell! Schimper! Plowden! Ferret & Galinier.*

2. **C. chamæcephalus,** *O. & H.* Acaulescent perennial herb. Leaves in a rosette, narrowly elliptical, petiolate, pinnatipartite, 5–10 in. long, puberulous; segments shortly ovate, incise-dentate, sparingly spinous-ciliate, teeth and apex terminating in spines $\frac{1}{10}$–$\frac{1}{5}$ in. long. Capitula oblong, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, sessile, many together in a solitary rounded cluster of about 4 in. diam. Involucral bracts nearly glabrous, the outer ones lanceolate, the inner ones narrowly so, all gradually terminating in a rather long straight erect spine.—*Cnicus chamæcephalus*, Vatke in Linnæa, xxxix. p. 511 (1875).

Nile Land. Abyssinia, alt. 8,500 ft., *Schimper!*

3. **C. Schimperi,** *Schultz Bip. in Herb. Schimp. Abyss.* ii. n. 1301. Acaulescent perennial herb. Leaves in a rosette, narrowly oblong, petiolate, deeply pinnatifid, 2–5 in. long, puberulous; segments shortly ovate, incise-dentate, sparingly spinous-ciliate, teeth and apex terminating in spines $\frac{1}{4}$–$\frac{1}{2}$ in. long. Capitula oblong or campanulate, 1–$1\frac{1}{2}$ in. long, sessile, few together, in a solitary cluster of $1\frac{1}{2}$–3 in. diam. Involucral bracts imbricated in many rows, the outer ones lanceolate, the inner ones linear-oblong with lanceolate tip terminating gradually in a very short erect spine, glabrous or very nearly so, minutely ciliate above. Flowers purple.—A. Rich. Fl. Abyss. i. p. 455.

Nile Land. Abyssinia, Mount Selki, alt. 10–13,000 ft., *Schimper!* Samen, *Ferret & Galinier.*

DOUBTFUL AND UNKNOWN SPECIES OF CARDUUS.

Carduus Buchingeri, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 283, name only, from Abyssinia.

Carduus macracanthus, Schultz Bip. *l. c.* also from Abyssinia. We have seen a single involucral bract with a pinnatifid spine, lent from the Berlin herbarium (Schimper § v. n. 51, ed. Buchinger, anno 1854).

98. CNICUS, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 468.

Habit and character wholly of *Carduus* excepting setæ of pappus conspicuously plumose.

Another large genus chiefly confined to the Northern Hemisphere.

Leaves pinnatifid. Involucral bracts all acute.
Leaves hispid-prickly above. Involucral bracts quite entire . . . . . 1. *C. lanceolatus.*
Leaves puberulous. Involucral bracts ciliate-spinous . 2. *C. polyacanthus.*
Leaves undivided. Inner involucral bracts obtuse . . . 3. *C. Schimperi.*

1. **C. lanceolatus,** *Willd. Fl. Berol. Prodr.* p. 259 (1787). An erect branched annual or biennial herb, 1–5 ft. high. Branches thinly arachnoid, spinous-winged in the upper part. Radical leaves petiolate; stem-leaves lanceolate, sessile, decurrent, acute, pinnatifid, hispid-prickly above, thinly white-tomentose beneath, from a few inches to a foot long; lobes lanceolate acute terminating in a long spine, ciliate-spinulose. Capitula ovoid, 1–1½ in. long, solitary or few together on very short pedicels at the extremities of the stem and branches. Involucral bracts narrowly lanceolate, acute, very numerous, the outer ones somewhat cottony, the inner glabrous, spreading and arching in fruit.—*Carduus lanceolatus*, Linn. Sp. Pl. edit. i. p. 821; *Cirsium lanceolatum*, Scop. Fl. Carnio. ii. p. 130 (1772); *Cirsium abyssinicum*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 1321; A. Rich. Fl. Abyss. i. p. 456.

Nile Land. Abyssinia, *Schimper! Q. Dillon & Petit! Roth! Ferret & Galinier!*
Spread over Europe, temperate Asia, and North Africa; introduced into America.

2. **C. polyacanthus,** *Hochst. in Herb. Schimp. Abyss.* ii. n. 1147 *sub* Cirsio; Vatke in Linnæa xxxix. p. 510 (1875). Stem erect, branched, sulcate-striate, puberulous, interruptly winged, some feet high. Stem-leaves sessile, narrowly elliptic, narrowed at both ends, pinnatifid, puberulous or glabrate, 2–8 in. long or more; lobes ovate, incise-dentate, spinous, separated by obtuse sinuses; spines ranging up to ⅔ in. or more. Capitula campanulate, ¾–1 in. long, solitary or a few together, very shortly pedunculate. Involucral bracts narrowly lanceolate, terminating in a long spine, ciliate-spinous, glabrous, not patent. Setæ of the receptacle nearly ½ in. long.—A. Rich. Fl. Abyss. i. p. 456.

Nile Land. Abyssinia, *Schimper!*

3. **C. Schimperi,** *Vatke in Linnæa* xxxix. p. 511 (1875). Stem erect subsimple or branched, thinly arachnoid-cottony or subglabrate, 3 ft. high or more. Stem-leaves oval-oblong, sessile, shortly decurrent, obtuse or subacute, apiculate, remotely serrulate-spinulose, white cottony or obsoletely so beneath, ranging up to 6 by 1⅓ in. Capitula solitary, on peduncles of 1–3 in., hemispherical, 1–1½ in. diam., with narrowly lanceolate bracts near the base. Involucral bracts oblong and obtuse or the outer ones lanceolate and acute, ciliate-spinulose, thinly cottony or glabrous.—*Cirsium arctotidifolium*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 144.

Nile Land. Abyssinia, *Schimper!*
Var. *inermis*, O. & H. Leaves narrowly lanceolate-oblong, scarcely spinulose, ranging up to 7 by ⅗ in.
Nile Land. Abyssinia, *Schimper!*
Cirsium Buchingeri, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 284, name only, from Abyssinia, is unknown to us.

99. **CENTAUREA,** Linn.; Benth. et Hook. F. Gen. Pl. ii. p. 477.

Capitula heterogamous, florets tubular or dilated above, outer 1-seriate usually larger neuter, or all the florets fertile. Involucre ovoid globose or campanulate, bracts ∞-seriate imbricate appressed usually with a terminal scarious or spinescent apex. Receptacle plane densely setose. Style-branches slightly thickened or with a minute papillose annulus at the base. Pappus pluri- or ∞-seriate, setaceous or more or less paleaceous, outer setæ shorter, or pappus 0.—Herbs with radical or alternate entire toothed or pinnatisect leaves and solitary or variously cymose pedunculate or sessile purple rose white or yellow capitula, in a few species sheathed more or less by the upper leaves.

A large genus of the Northern Hemisphere chiefly of the Mediterranean region and W. Asia.

Involucral bracts furnished with a terminal appendix.	
Appendix pectinate, not spinous (*Plectocephalus*, D. Don).	
Upper leaves not auriculate. Pappus $\frac{1}{12}$ in. long .	1. *C. varians.*
Upper leaves bi-auriculate. Pappus $\frac{5}{12}$ in. long . .	2. *C. abyssinica.*
Appendix spinous.	
Terminal spine long. Setæ of pappus long and slender or 0 (*Calcitrapa*, Juss.).	
Pappus wanting	3. *C. Calcitrapa.*
Pappus copious, as long as the achene	4. *C. senegalensis.*
Spines palmate, short. Setæ of pappus short, stout, compressed, acute (*Seridia*, Juss.).	
Leaves oval-oblong, obtuse	5. *C. rhizocephala.*
Leaves linear, acute	6. *C. præcox.*
Involucral bracts mucronate without appendix. Pappus containing rather long obtuse paleæ (*Microlonchus*, Cass.).	
Capitula cymose. Involucral bracts thinly arachnoid and scabrid	7. *C. Hochstetteri.*
Capitula solitary. Involucral bracts thinly cottony on the margin, not scabrid	8. *C. somalensis.*

1. **C. varians,** *A. Rich. Fl. Abyss.* i. p. 453. An ascending nearly glabrous perennial, 4–15 in. high. Stems decumbent at base, striate, terete, shining, puberulous, simple or nearly so. Radical leaves elliptical, obtuse, denticulate, somewhat scabrid on the margins, attenuate at the base into short petiole, 2–5 by $\frac{1}{2}$–$1\frac{1}{4}$ in.; upper leaves sessile, gradually smaller and more lanceolate, not auriculate. Capitula solitary pedunculate, campanulate, 1 in. long or nearly so; peduncle ranging up to 4 in. Involucral bracts appressed, oblong-lanceolate, yellow, going off into a black lanceolate appendix which is decurrent on both sides and pectinate with pale cilia rather longer than the width of the appendix. Ligule of the ray-florets purple. Pappus $\frac{1}{12}$ in. long, setaceous, tawny.—*Plectocephalus cyanoides*, Boiss. Diagn. ser. ii., iii. p. 62.

Nile Land. Abyssinia, Ouodgerate, *Petit!* Tchélatchekanné, *Q. Dillon; Schimper!* alt. 9,300 ft., *Plowden! Salt!*

2. **C. abyssinica,** *Schultz Bip. ex Boiss. Diagn.* ser. ii., iii. p. 62. A robust erect scabrid perennial, 2–5 ft. high. Stems simple or nearly

so, striate-sulcate. Leaves linear-oval, acute, sessile, shortly bi-auriculate at the broad base, distantly or obsoletely denticulate, 2–10 by ¼–2 in.; the upper ones gradually smaller, linear-lanceolate. Capitula solitary subhemispherical; involucre 1–1½ in. diam., pedunculate; peduncle ranging up to 9 in. long. Involucral scales appressed, yellow, going off into an appressed black triangular or ovate appendix which is decurrent on both sides and pectinate with pale cilia rather longer than the width of the appendix. Ligule of the ray-florets pale red. Pappus ¼–⅓ in. long, setaceous, tawny. — *Plectocephalus abyssinicus*, Boiss. *l.c.* p. 61; *C. varians*, A. Rich.; *β. macrocephala*, Vatke in Linnæa xxxix. p. 512 (1875).

Nile Land. Abyssinia, *Schimper! Roth!*

3. **C. Calcitrapa,** *Linn. Sp. Pl.* edit. i. p. 917. A rigid diffusely branched scabrid glabrescent or subtomentose pale erect annual or biennial, 1–2 ft. high. Leaves pinnatifid or pinnatisect, sometimes lyrate or undivided, denticulate, sessile or the lower ones narrowed into a short petiole, not decurrent, 1–4 in. long. Capitula ovoid, ¼–¾ in. thick, lateral and subsessile or terminating leafy branches, solitary. Involucral bracts glabrous or arachnoid, shining, mostly terminating in a long spreading yellowish spine some ¾–1¼ in. long with a few smaller ones on each side; innermost bracts sometimes with a wide scarious unarmed lacerated tip. Flowers usually purple. Achenes pale, shining, ⅕–¼ in. long, without pappus.—*C. Perrottetii*, DC. Prodr. vi. p. 598. *? C. Kotschyi* Schultz Bip. (*C. kordofana*, Aschers.) in Schweinf. Beitr. Fl. Æthiop. p. 307.

Upper Guinea. Senegambia, *Perrottet!* (spines less stellate than in the typical form).

North Central. Kouka, Bornu, *E. Vogel!* (many-headed and much-branched form).

Nile Land. Cordofan, *Kotschy!* (heads sometimes large).

Widely spread over the North Temperate Zone.

4. **C. senegalensis,** *DC. Prodr.* vi. p. 598. A coarse much-branched scabrid annual or biennial, 2 ft. high or more. Stem-leaves oval ovate or lanceolate, sessile, obtuse or the uppermost acute, apiculate, denticulate, semi-amplexicaul, scarcely or somewhat auriculate, ½–2 in. long. Capitula ovoid-globose, ½–⅔ in. thick, terminating leafy branches, solitary. Involucral bracts glabrous or thinly arachnoid, shining, mostly terminating in a long erect spreading or recurved pale yellowish spine, some about 1 in. long with a few smaller ones on each side; innermost bracts with a wide scarious unarmed or mucronate lacerated tip. Flowers purple. Achenes pale, shining, ¼ in. long, furnished with a copious barbellate setaceous tawny or nearly white pappus about ⅓ in. long.

Upper Guinea. Senegambia, *Perrottet! Leprieur!*

North Central. Kouka, *E. Vogel!*

Nile Land.? Cordofan (and Egypt), (*? C. pappposa*, Schultz. Bip. in Schweinf. Beitr. Fl. Æthiop. p. 284, name only).

5. **C. rhizocephala,** *O. & H.* An erect granular-hirsute stiff herb, 1–2 ft. high, from a shrubby stock. Cauline leaves oval-oblong, obtuse, sessile, rounded at the base, scarcely auriculate, 3–5 by about 1 in. Capitula urceolate-campanulate, 1–1½ in. long including the florets, on pedicels ⅓–⅔ in. long, 3–9 together, in simple or compound trichotomous cymes at the end of short radical or subradical shoots. Involucral bracts deltoid or the inner ones deltoid-oblong, glabrous, terminating with an appendix bearing 3–5 short spines. Ligule of ray-florets white; disk-florets rose-coloured. Achenes glabrous. Pappus about $\frac{1}{12}$ in. long; setæ stout, compressed, acute.

Nile Land. Bongo-land. Ssabbi, on the burnt steppes, flowering for the second time, Nov. 20, 1869, *Schweinfurth!*

A small specimen, perhaps flowering for the first time, with a head 1½ in. long and young undeveloped leaves, collected by *Petherick*, probably by the White Nile, may belong to this species.

6. **C. præcox,** *O. & H.* Erect perennial herb, branched below from a woody stock, 1–2 ft. high; branches obsoletely cottony above. Leaves linear, acute, rigid, white-cottony when young, glabrescent, sessile, not auriculate, ranging up to 3 by ¼ in.; margins revolute, obsoletely denticulate. Capitula campanulate, urceolate in fruit, about ¾–1 in. long, on radical or subradical and occasionally cauline peduncles ranging up to 2 in., which usually appear just above the soil before the leaves. Involucral bracts deltoid or oblong-deltoid, glabrous, terminating with an appendix of 3–5 palmately set slender spines, the longest of which is about ⅙–⅕ in. long. Flowers yellow and bluish. Achenes glabrous, thick, about ⅜ in. long. Pappus $\frac{1}{10}$ in. long; setæ stout, compressed, acute.

Upper Guinea. Niger, Joruba, on stony hills, *Barter!*

7. **C. Hochstetteri,** *O. & H.* An erect, whitish, puberulous or cottony, branched herb, more than 2 feet high. Branches striate, sulcate below. Stem-leaves pinnatipartite or pinnatifid or the uppermost ones subentire, sessile or nearly so, not auriculate, 1½–4 in. long; lobes linear or oval, the terminal one largest. Capitula campanulate, about ¾ in. long (exclusive of the ray-florets), on pedicels ranging up to 5 in., in open terminal cymes. Involucral bracts appressed, linear-lanceolate or the outermost lanceolate and successively shorter, thinly arachnoid and scabrid, terminating in a black acute hard quite entire apiculus. Florets purple. Achenes setose at least above, ⅙ in. long, obscurely ribbed. Pappus paleaceous, erect-patent, obtuse, as long as the achenes. — *Amberboa abyssinica*, A. Rich. Fl. Abyss. i. p. 453. *A. Hochstetteri*, Buchinger in litt. ad Hochst. (Herb. Schimp. Abyss. ed. Hohenacker. A.D. 1854, n. 2183).

Nile Land. Abyssinia, alt. 5,700–6,000 ft., *Schimper!* Ouodgerate, *Petit!*

8. **C. somalensis,** *O. & H.* Branches white, obsoletely tomentose below, cottony above. Leaves obovate (or the upper ones oblanceolate or linear), pinnately toothed and some lobed, puberulous-glandular on both surfaces, narrowed towards a sessile base or the lower

ones petiolate, ranging up to 3 by 1 in.; teeth pointed, not spinous. Capitula solitary, heterogamous, pedunculate, campanulate, $\frac{3}{4}$ in. long; peduncle about $1\frac{1}{2}$ in. long, terminal. Involucral bracts in many rows, not appendaged, imbricated, inner ones linear, outer lanceolate or ovate, successively shorter; tips acute, not spinous, blackish and thinly cottony on the margins. Florets pale blue, outer ones neuter, longer than the hermaphrodite fertile inner ones. Anther-base with long linear tails. Achenes (young) not quite glabrous. Pappus paleaceous, denticulate, exceeded by the paleaceous setæ of the receptacle.

Nile Land. Somali-land, 6,000 ft. alt., April, 1875, *Hildebrandt!*

The last two species scarcely differ, if at all, from the genus *Volutarella*, Cass. (*Amberboa*, Isnard).

Amberboa sinaica, DC., is given by Schweinfurth and Ascherson, Enum. p. 283, as occurring in Nubia; according to Boissier, Fl. Orient. iii. p. 606, this species occurs in Egypt, Arabia and Palestine.

100. CARTHAMUS, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 483.

Capitula homogamous; florets all fertile (rarely outer 1-seriate ♀ or 0). Involucre ovoid or subglobose; bracts ∞-seriate, imbricate below, the outer or intermediate foliaceous and spinescent in wild forms. Receptacle plane, setose. Pappus more or less paleaceous, ∞-seriate, occasionally 0.—Thistle-like rigid herbs, with alternate spinose-pinnatifid or spinulose-serrate leaves and terminal solitary or cymose rather large often fiercely involucrate scarlet yellow whitish or rose capitula.

Chiefly confined to the Mediterranean region and Levant.

Pappus 0, or of the central florets altogether short. Leaves undivided	1. *C. tinctorius.*
Pappus (of the central florets) in many rows, inner rows successively longer. Leaves pinnatifid.	
More or less pilose. Floral leaves about 1 in. long . . .	2. *C. lanatus.*
Nearly glabrous. Floral leaves about $1\frac{1}{2}$–2 in. long . . .	3. *C. leucocarpus.*

1. **C. tinctorius,** *Linn. Sp. Pl.*, edit. i. 830. A glabrous erect leafy annual, branched above. Stem-leaves sessile, ovate-oblong, acute, mucronate, spinulose-denticulate, 1–3 in. long or more; floral ones similar, 1–$1\frac{1}{4}$ in. long. Capitula 1–$1\frac{1}{4}$ in. thick. Pappus wanting from the outer florets, very short on the central ones.—A. Rich. Fl. Abyss. i. p. 454.

Nile Land. Nubia, Sennaar and Abyssinia, cultivated and perhaps indigenous. Yields the commercial dye called "Safflower."

Widely cultivated in Northern India and the East.

2. **C. lanatus,** *Linn. Sp. Pl.*, edit. i. p. 830. Erect more or less pilose annual, simple below, $1\frac{1}{2}$–2 ft. high. Leaves pinnatifid, spinous, 1–2 in. long; the upper ones sessile, acute, semi-amplexicaul, lanceolate; floral ones similar.—*Kentrophyllum lanatum*, DC. et Dub.; DC. Prodr. vi. p. 610; A. Rich. Fl. Abyss. i. p. 454 (var. *abyssinicum*).

Nile Land. Abyssinia (introduced?), *Q. Dillon; Petit; Schimper!*

Widely cultivated; it extends, according to Boissier, Fl. Orient. iii. p. 707, to the Mediterranean region, the Canary Islands and Madeira.

3. **C. leucocaulos,** *Sibth. Fl. Græca*, t. 842. An erect glaucous nearly glabrous prickly annual, 1–1½ ft. high, simple below. Stem white, terete, smooth. Leaves deeply pinnatifid, the upper sessile, the lower narrowed into a short petiole, 1–4 in. long; lobes ovate, patent, entire, ending in a sharp spine, the terminal one longer, lanceolate, spinulose-denticulate; the floral leaves 1½–2 in. long. Capitula ⅓–⅖ in. thick, terminating the apical divaricate branches. Inner involucral bracts lanceolate, acute, minutely denticulate near the apex, not dilated at base, about ⅔ in. long. Setæ on the receptacle ⅜ in. long. Pappus multiseriate; outer rows shorter, obtuse, subpaleaceous, inner subsetaceous, acute.—*Kentrophyllum leucocaulon*, DC. Prodr. vi. p. 610, cum syn. *C. lanatus*, Linn., var. *gracilis*, Schweinf. Fl. v. Sot. p. 17, n. 173. *C. persicus*, W., Sp. Pl. 1707, et herb. ex Boiss. Fl. Orient. iii. p. 708.

Nile Land. Soturba, Nubia, 22° N. Lat., 2,000 ft. alt., *Schweinfurth!*

Common in Greece and occurs also in Crete, the islands of the Archipelago and Egypt.

101. **PLEIOTAXIS,** Steetz; Benth. et Hook. f. Gen. Pl. ii. p. 487.

Capitula many-flowered, homogamous; florets all tubular, hermaphrodite. Involucre oblong-turbinate; bracts ∞-seriate, closely imbricate, inner oblong, outer ovate, successively shorter. Receptacle "epaleaceous." Corolla-tube slender, suddenly dilated and deeply 5-fid above. Anther-cells with villous or ciliate tails. Achenes striate-angular, with 6–7-seriate pappus; setæ rigid, very unequal. Style-branches short, diverging, terminating in a short rounded glandular appendix.—Herb with alternate petiolate denticulate leaves, hoary beneath, and solitary terminal purple capitula.

A monotypic genus.

1. **P. pulcherrima,** *Steetz in Peters, Reise Mossamb. Bot.* p. 500, t. 51. An erect simple herb, somewhat woody at the base, more than a foot high; stems simple, terete, striate, silky-tomentose, whitish, leafy to the top. Leaves elliptical, narrowed towards both ends, serrulate or entire, silky-tomentose and hoary beneath, 4–5½ by 1¼–1½ in.; petiole about ½ in., sheathing. Capitula solitary, terminal, 1½ by ¾ in.; peduncle short, clothed with long stiffish ascending hairs. Involucral bracts glabrous, ovate, obtuse, the inner ones gradually longer, the outer ones continued down the short peduncle. Corollas finely purple. Achenes hairy, ⅓ in. long.

Mozamb. Distr. Sena, *Peters!* (in Herb. Berol.).

102. **ERYTHROCEPHALUM,** Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 488.

Capitula homogamous; outer florets 2-labiate, 1-seriate, inner tubular, deeply 5-partite. Involucre campanulate; bracts pauci- or pluri-seriate, imbricate, outer lanceolate or ovate, inner passing into the paleæ of the receptacle. Ray-florets with an outer 3-dentate ligule

and shorter bipartite inner lip. Anther-base produced in oblong fimbriate or ciliolate appendices connate in pairs. Style-branches recurved, apices truncate or shortly conical. Achene thick, ellipsoidal, 5-angled; pappus of few (4–5) caducous narrow-linear setæ.—Erect herbs (in one species at least tuberous-rooted), with alternate denticulate or entire leaves, hoary beneath, and terminal solitary pedunculate scarlet capitula.

Confined to Eastern Africa.

Teeth of the leaves acute.

Leaves narrowly oval. Heads erect	1. *E. zambesianum.*
Leaves broadly oval. Heads drooping	2. *E. nutans.*

Teeth of the leaves obtuse or nearly obsolete.

Leaves 4–7½ in. long	3. *E. longifolium.*
Leaves 1–2 in. long	4. *E. minus.*

1. **E. zambesianum,** *O. & H.* Stem white-cottony, apparently simple, leafy. Leaves oval or linear-elliptical, acute, narrowed towards the sessile semi-amplexicaul base, acutely serrulate, white-cottony beneath, glabrescent above, 1½–5 by ⅓–1 in. Capitula solitary, terminal, erect, ⅔–¾ in. long. Peduncle 1–1½ in. Involucral bracts lanceolate, outer about ⅖ in. long, margins reddish, fimbriate-denticulate. Ligule ⅜–½ in. long; inner lip bipartite, partitions linear, ⅛–¼ in. long. Ovary puberulous.

Mozamb. Distr. R. Shire Valley, *Waller!* Manganja country, alt. 3,000 ft., *Kirk!* (flowers scarlet).

2. **E. nutans,** *Benth.*; *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 102, t. 69. Thinly white-arachnoid on the stem underside of leaves and involucre, nearly 1 ft. long. Stem striate simple below, about 6-leaved. Leaves broadly oval, obtuse or cuspidate, narrowed to the sessile or subsessile amplexicaul base, acutely and unequally denticulate, 2–7 by 1–3½ in. Capitula solitary, terminal, drooping, 1 in. long (exclusive of the rays). Peduncles about 6 in. long. Involucral bracts lanceolate, outer ½ in. long, margins fimbriate-denticulate. Ligule about 1 in. long; inner lip of 2 lanceolate teeth about ⅕ in. long. Achenes scabrid, obsoletely pubescent.—*Arctotis ??*, n. 1, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. 3° S. Lat. 33° E. Long, alt. 3800 ft., *Speke and Grant!* (flowers bright scarlet).

3. **E. longifolium,** *Benth.*; *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 102. Root tuberous. Stem thinly white-cottony, rather more than a foot high, somewhat branched, leafy. Leaves obovate-elliptical, obtuse or apiculate, obtusely or subobsoletely denticulate, attenuate to the sessile base, whitish-cottony beneath, glabrescent above, ranging up to 7½ by 2½ in. Capitula solitary, terminal, erect, about ¾ in. long. Peduncle about 4 in. Involucral bracts fimbriate-denticulate at the tip. Ligule about ½ in. long; inner lip bipartite, partitions narrow-linear, about ¼ in. long. Ovary pubescent.—*Arctotis ??*, n. 2, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. East Equatorial Africa, *Speke and Grant!* (flowers deep scarlet, common).

4. **E. minus,** *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 103. Root tuberous fusiform, 8 in. long, 10 in. in circumference. Stem bifid near the base, 4 in. high, leafy. Leaves elliptical, obtuse or apiculate, sessile, amplexicaul, repand-denticulate, white-cottony below, subglabrescent above, 1–2 by $\frac{3}{8}$–$\frac{5}{8}$ in. Capitula $\frac{3}{4}$ in. long, solitary, terminal, erect, shortly pedunculate. Involucral bracts cottony; tips reddish, fimbriate-denticulate. Ligule $\frac{1}{4}$ in. long; the inner lip bipartite, $\frac{1}{5}$ in. long, the partitions narrowly linear. Ovary puberulous.—*Compositæ dubiæ*, T. Thoms. in Speke, Journ., App. p. 638.

Mozamb. Distr. Mŭhonyera, "flowers yellow," *Speke and Grant!*

103. **PHYLLACTINIA,** Benth.; Benth. et Hook. f. Gen. Pl. ii. p. 488.

Capitula heterogamous radiate, ray-florets ligulate neuter, disk-florets short, campanulate and 5-partite above. Involucre hemispherical or broadly campanulate, bracts pluriseriate narrow long-acuminate recurved arachnoid closely sheathed by leafy bracts overtopping the head. Receptacle alveolate with membranous teeth. Anther-cells sagittate with acute retrorse-setose tails. Style minutely 2-dentate. Achenes 10-costate with intermediate setæ; pappus pluriseriate, paleæ linear, the inner acute, coriaceous.—Annual branching tomentose herb with alternate leaves and terminal solitary (purple-rayed ?) capitula about 1 in. diameter.

A monotypic genus.

1. **P. Grantii,** *Benth.*; *Oliv. in Trans. Linn. Soc. Lond.* xxix. p. 102, t. 68. A viscid subtomentose diffusely branched leafy annual, 6–9 in. high. Leaves elliptical, obtuse or cuspidate, minutely and acutely dentate, narrowed at the base into a short petiole, subglabrous above, subtomentose below, $1\frac{1}{4}$–$2\frac{1}{2}$ by $\frac{3}{8}$–$\frac{3}{4}$ in. Capitula solitary, terminal, sessile, nearly 1 in. diameter. Involucral bracts arching outwards, elongate subulate-acuminate. Ligule $\frac{1}{2}$ in. long or rather more.—*Cullumia*, n. 3, T. Thoms. in Speke, Journ., App. p. 638.

Nile Land. Mininga, 4° 18′ S. Lat., in cornfields, *Speke and Grant!*

104. **DICOMA,** Cass.; Benth. et Hook. f. Gen. Pl. ii. p. 492.

Capitula homogamous, florets all tubular ♂ (or occasionally with an outer row imperfect or subligulate ♀). Involucre more or less campanulate or subglobose; bracts ∞-seriate, imbricate, ovate to linear, rigid, usually spinescent-acuminate. Receptacle naked smooth or foveolate. Anther-base sagittate, tails barbellate. Style-branches very short. Achenes setose or villous, pappus pluriseriate, paleaceous or setaceous, barbellate or plumose.—Herbs or frutescent with alternate linear and elliptical more or less tomentose leaves and capitula terminal and solitary or in corymbose cymes or racemose, on short lateral branches.

The rest of the species belong to the Cape Flora.

Outer pappus setaceous, inner paleaceous. Root annual . . 1. *D. tomentosa.*
Pappus all setaceous. Root perennial.
  Setæ of pappus barbellate. Habit diffuse . . . . . 2. *D. anomala.*
  Setæ of pappus plumose. Habit erect.
    Capitula pedicellate. Leaves with broad base . . . . 3. *D. Kirkii.*
    Capitula sessile. Leaves tapering at base . . . . . 4. *D. sessiliflora.*

1. **D. tomentosa,** *Cass. in Bull. Soc. Philom., Mart.* 1818. Cottony erect much branched or simple annual, with a shrubby habit, 6–24 in. high. Branches terete. Leaves narrowly elliptical or spathulate, apiculate, obsoletely denticulate, narrowed to subsessile base, $\frac{1}{2}$–$2\frac{1}{2}$ in. long. Capitula numerous, campanulate, about 14-flowered, on very short axillary branches and terminal, $\frac{1}{2}$–$\frac{5}{6}$ in. long, discoid, homogamous. Involucral bracts lanceolate tapering into apical spines, arachnoid or cottony outside, the inner suberect, the outer shorter spreading. Corolla white or pale yellow. Achenes densely silky. Pappus duplex; outer of barbellate setæ 2–3 times the length of the achene, tawny, biseriate; the inner row of rather widely scarious aristate-acuminate paleæ, nearly as long as the outer.—DC. Prodr. vii. p. 36; A. Rich. Fl. Abyss. i. p. 459; *D. lanuginosa*, DC. l.c. cum syn.; *Schaffnera carduoides*, Schultz Bip. in Herb. Kotsch. Nubico, n. 100.

Upper Guinea. Senegambia, *Perrottet, Leprieur!* Niger, *Barter!*
North Central. Kouka, *E. Vogel.*
Nile Land. Cordofan, *Kotschy! Cienkowsky,* Abyssinia, *Schimper! Hildebrandt!*

Mozamb. Distr. Kaimba Island, opposite Tette, *Kirk!* Rios de Sena, *Peters!*
Widely spread in the East Indies.

2. **D. anomala,** *Sond. in Linnæa,* xxiii. p. 71 (1850). Rigid, much branched diffuse perennial, 3–12 in. high. Rootstock woody. Branches suffruticose, angular above, ashy, obsoletely pubescent, leafy. Leaves linear or very narrowly oval, narrowed at both ends, sessile, glabrescent above, hoary-tomentose beneath, 1-nerved, minutely serrulate, $\frac{1}{3}$–$2\frac{1}{2}$ in. long. Capitula sessile, termiral, discoid, homogamous, narrowly to broadly campanulate, $\frac{2}{5}$–$\frac{4}{5}$ in. long. Involucral bracts in many imbricating rows, glabrous or obsoletely cottony, very narrowly lanceolate, gradually tapering into a pungent tip; outer ones successively shorter and often more spreading. Flowers purple or white. Achenes densely setose. Pappus pluriseriate, about 4 times the length of the achene, of barbellate setæ, very narrowly paleaceous at base.—Harv. et Sond. Fl. Cap. iii. p. 517.

Form 1. *Sonderi,* Harv. Leaves narrowly linear. Heads rather large.
South Central? South African Gold Fields, *Baines!*
Form 2. *microcephala,* Harv. (*D. Gerrardi,* Harv.). Leaves narrowly linear. Heads rather large.
South Central? South African Gold Field, *Baines!*
Form 3. *karaguensis,* O. & H. *D. karaguensis,* Oliv. in Trans. Linn. Soc. Lond. xxix. 103, t. 70. Leaves narrowly oval. Involucral bracts suberect. Heads rather large.

Nile Land. Karagué, *Speke and Grant!*
Occurs also in Eastern districts of the Cape Flora.

3. **D. Kirkii,** *Harv. Fl. Cap.* iii. p. 518. An erect rigid herb, 2–3 ft. high. Rootstock woody. Stem leafy and simple below, white-cottony. Leaves lanceolate, very acute, sessile, broad and semiamplexicaul at base, glabrate above, shortly cottony beneath, 2–4 in. long. Capitula 1–1½ in. long, on pedicels of ½–1 in. long, in a corymbose cyme. Involucral bracts imbricated, pale, glabrous, minutely serrulate, rigid, lanceolate, with a pungent subulate tip, suberect or the outer ones shorter and spreading. Achenes densely silky. Pappus pluriseriate, many times exceeding the achene, plumose.

South Central. Highlands of Batoka country, *Kirk!*
It is not known to occur south of the tropic.

4. **D. sessiliflora,** *Harv. Fl. Cap.* iii. p. 518. An erect rigid perennial herb, simple or nearly so, about 2 ft. high. Rootstock woody. Stem more or less silvery-cottony, herbaceous. Leaves narrowly elliptical, somewhat narrowed to a rather obtuse or subacute apex, narrowed to a sessile base, glabrate above, white-cottony or obsoletely tomentose beneath, obscurely serrulate or quite entire, 3½–8 in. long; the lowest ones broader. Capitula sessile or nearly so, on very short or incipient lateral branches and terminal, solitary or few together in dense cymes, discoid, homogamous, 1–1½ in. long. Involucral bracts imbricated, pale, subglabrous, minutely serrulate, rigid, lanceolate, with a pungent subulate tip or the innermost mucronate or obtuse, suberect or the outer shorter and at length spreading. Flowers pale yellow. Achenes densely pilose. Pappus pluriseriate, plumose, many times longer than the achene.

Upper Guinea. Niger, Borgu, *Barter!*
Nile Land. Djur-land, *Schweinfurth!*
Mozamb. Distr. Zambesi, Lake Chidia, *Kirk!* Rios de Sena, *Peters!*
It is not known to occur south of the tropic.

105. HOCHSTETTERIA, DC.; Benth. et Hook. f. Gen. Pl. ii. p. 492.

Characters of *Dicoma*, differing in having a simple 1-seriate pappus of 10 long setæ dilated below.—Rigid branched perennial with alternate often glabrous leaves and terminal pedunculate hemispherical heads, subglobose in fruit.

A monotypic genus.

1. **H. Schimperi,** *DC. Coll. Mem.* ix. 23, t. 6; *Prodr.* vii. 287. A glabrous branched rather rigid perennial herb, some feet high. Branches angular. Leaves oval obtusely pointed at apex, attenuate at base into a short narrowly winged petiole, minutely crenate, ½–2 in. long. Capitula about ½ in. long usually with foliaceous bracts at base shorter than the involucre. Involucral bracts narrowly lanceolate, very acute, rigid, pungent.

Nile Land. Soturba 22° N. Lat., *Schweinfurth!*
Occurs also in Arabia and Scinde.

106. **GERBERA,** Gronov. ; Benth. et Hook. f. Gen. Pl. ii. p. 497.

Capitula heterogamous radiate; ray-florets usually ♀. Involucre turbinate or broadly campanulate, bracts pauciseriate, imbricate, linear or linear-lanceolate, not rigid. Receptacle naked. Ray-florets ligulate, with an inner short 2-partite lip; disk-florets 2-labiate. Anther-base tailed. Style-branches linear or oblong rather obtuse. Achenes somewhat compressed, more or less beaked in our species, with 5 or more longitudinal ribs; pappus setaceous, setæ barbellate or smooth, 1- or pauciseriate.—Acaulescent herbs with oval radical leaves and 1-headed scapes.

The species are chiefly South African.

Ray-florets much exceeding the involucre. Leaves obtuse at base . . . . . 1. *G. abyssinica.*
Ray-florets nearly as short as the involucre. Leaves attenuate at base . . . . . 2. *G. piloselloides.*

1. **G. abyssinica,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 193. Rootstock thick, cottony above. Leaves oval, rounded or mucronate at the apex, obtuse or excavated at the base, sinuous-denticulate, glabrescent above, pubescent below with short curly hairs, membranous, 1½–4 by ⅔–1½ in. besides petiole ranging up to 2 in. long. Scapes solitary or 2–3, ranging to 15 in., naked, more or less shaggy. Capitula ¾–1 in. long, erect. Involucral bracts narrowly lanceolate, acute, more or less shaggy, not exceeding ½ in. long. Ligules much exceeding the involucre. Achenes somewhat hairy, tapering at apex. Pappus subrufous.—A. Rich. Fl. Abyss. i. p. 458.

Nile Land. Abyssinia, *Schimper! Q. Dillon!*
Abyssinian name, Kuetzli-ena-Dekāla.

2. **G. piloselloides,** *Cass. in Dict. Sc. Nat.* xviii. p. 461. Rootstock thick, silky-tomentose. Leaves oval, rounded at the apex, attenuate at base into a petiole ranging up to 1½ in. long or more, quite entire or repand-denticulate, glabrate or sparsely pilose above, softly pilose beneath, submembranous, 1½–6 in. or more including the petiole. Scapes solitary or 2–4, ranging up to a foot or 15 in. high, pilose-tomentose or at length subglabrate, more or less thickened towards the apex, nude or occasionally bearing a linear scale near the middle. Capitula ¾–1 in. long, erect. Involucral bracts linear, tapering upwards, tawny-shaggy, acute, some nearly equalling the uniseriate ray-flowers. Ligules purple outside, white inside. Ripe achenes long-beaked, papillose. Pappus subrufous.—DC. Prodr. vii. p. 16; Harv. Fl. Cap. iii. p. 522; *Arnica piloselloides,* Linn. Pl. Afr. Rar. n. 73 (1760); *G. ovalifolia,* DC. l.c. p. 17; *G. Schimperi,* Schultz Bip. in Herb. Schimp. Abyss. i. n. 185; A. Rich. Fl. Abyss. i. p. 458.

Nile Land. Abyssinia, *Schimper! Q. Dillon, Petit.*
South Central? South African Gold Field, *Baines!*
?Mozamb. Distr. Usagara Hills, *Speke and Grant!* (a poor specimen).
Occurs also widely spread in the Cape Flora, Madagascar and temperate India.

107. **SCOLYMUS**, Linn.; Benth et Hook. f. Gen. Pl. ii. p. 504.

Capitula homogamous, ligulate; florets equal. Involucre ovoid or subglobose; bracts in few rows, imbricated, the outermost (or floral leaves) large, spinous-pinnatifid or -pectinate, exceeding the florets. Receptacle elevated or conical, paleaceous; paleæ dorsally compresso-plicate, enclosing the ovaries. Ligule truncate, 5-dentate. Anther-base sagittate; auricles mucronate-acuminate. Style-branches slender. Achenes dorsally compressed, inclosed in and adnate to the obcordate more or less winged paleæ of the receptacle. Pappus of 2–3-barbellate setæ which are wanting in our species, and of a denticulate annulus at the apex of the achene.—Erect thistle-like herbs with alternate spinous leaves, terminal or lateral sessile capitula, and yellow flowers.

A genus of 3 species chiefly Mediterranean.

1. **S. maculatus,** *Linn. Sp. Pl.*, edit. i. p. 813. A nearly glabrous coarse rigid annual, 1–3 ft. high. Stem and spreading branches whitish, winged by the decurrence of the leaves. Stem-leaves oblong, sinuous-pinnatifid, spinous-pointed, sessile, about 2–3 in. long; margins cartilaginous; the radical leaves broadly spathulate, spinous-dentate, subpetiolate, 3 by 1 in.; the floral leaves pectinate. Capitula nearly 1 in. long in flower. Inner involucral bracts linear-lanceolate, ½ in. long, entire, pointed. Outer ligules nigro-pilose. Achenes obovate. Setæ of the pappus 0.

Nile Land. Cordofan, *Kotschy!*
Occurs throughout the Mediterranean region.

108. **CICHORIUM**, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 506.

Capitula homogamous; florets all ligulate. Innermost involucral bracts sub-uniseriate, subcoriaceous, at length concave and embracing the outer achenes; the outer involucral bracts few, shorter. Receptacle nearly flat, naked or sparingly fimbrillate. Ligule truncate, 5-dentate at the apex. Anthers sagittate at the base; auricle mucronate-acuminate. Style-branches slender, rather obtuse. Achenes somewhat 5-angled or the outer ones rather compressed, obovoid, truncate or margined at the apex. Pappus shortly paleaceous or wanting.—Erect herbs, glabrous or sparingly hispid, with milky sap, alternate leaves, sessile (as well as sometimes pedunculate) heads, and blue flowers.

A genus of 4 species, chiefly found in the northern hemisphere of the Old World.

1. **C. calvum,** *Schultz Bip. in Ind. Sem. Hort. Berol., ann.* 1859, p. 7 (*nomen nudum*) *et in Schweinf. Beitr. Fl. Æthiop.* p. 143 *cum descript.* Annual. Stem erect, sparingly setose. Upper leaves oblanceolate, obtuse, rounded at the base, sessile, sparingly setose beneath especially on the midrib, unequally denticulate, ciliate-scabrous; the floral ones lanceolate-acuminate from a cordate base. Capitula 2–3 together, approximated, sessile, the top one only solitary

and pedunculate. Bracts of the involucre acuminate, setose-ciliate, sparingly tuberculate-scabrous on the back, more or less callous at the base; the outer ones ovate-oblong, shorter; the inner ones oblong-lanceolate. Achenes straw-coloured, obovate, angular-subcompressed, altogether without pappus, $\frac{1}{12}$ in. long.

Nile Land. Abyssinia (cultivated in the Berlin Garden in 1859).

109. **TOLPIS**, Adans.; Benth et Hook. f. Gen. Pl. ii. p. 508.

Capitula homogamous, florets all ligulate. Involucre more or less campanulate, bracts pauciseriate, inner linear-lanceolate subequal acute with pale margins, outer laxer shorter and narrower. Receptacle alveolate. Achenes subterete, longitudinally costate, not narrowed above, glabrous; pappus of about 12 slender 1-seriate setæ, simple, exceeding the achene, usually with intermediate short or rudimentary setæ.—Herb with toothed radical leaves and laxly cymosely-branched glabrous stem.

This description applies only to one species, which differs from the more typical ones in the pappus. The genus is chiefly confined to the Mediterranean region and the Atlantic Islands.

1. **T. abyssinica,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 1. Erect alternately branched perennial or biennial, 2–3 ft. high. Stems several from the pubescent-tomentose crown of the root, slightly hairy at base, glabrous above. Radical leaves oblanceolate pinnatifidly dentate, narrowed at the base, more or less petiolate, sparingly hairy, 4–8 in. long; stem-leaves few, linear, smaller. Capitula $\frac{5}{8}$–$\frac{3}{4}$ in. diam., on pedicels ranging up to 3 in. or more, in a lax open paniculate cyme. Achenes $\frac{1}{12}$ in. long, ribbed, dark brown.—A. Rich. Fl. Abyss. i. p. 459; *Schmidtia abyssinica*, Schultz. Bip. *l. c.*

Nile Land. Abyssinia, *Schimper!*

This is probably *Schmidtia ambigua*, Cass. (*Tolpis altissima*, Pers.) a name which was, according to Fresenius in Mus. Senckenb. iii. p. 60, given by Schultz Bip. to a specimen collected by Rüppell in Abyssinia. Boissier Fl. Orient. iii. p. 725, unites *Tolpis abyssinica*, Schultz Bip. with *T. altissima*, Pers., and gives at the same time further synonymy; this combination would extend the range of the species to Greece and the Levant.

110. **PICRIS**, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 511.

Capitula homogamous, florets all ligulate. Involucre campanulate; inner bracts 1-seriate imbricate subequal linear-lanceolate with a few outer much shorter and lax. Receptacle naked or setose. Achenes oblong slightly narrowed at each end, more or less longitudinally costate; pappus setaceous, inner setæ plumose, outer very short scabrid. —Acaulescent herb with toothed radical leaves and 1- or few-headed scapes. Capitula yellow.

The above description is based upon the only Tropical African species. The genus is mainly restricted to Europe, Temp. Asia and North Africa.

P.? humilis, DC. Prodr. vii. p. 130, described from imperfect material, from Senegal, is unknown to us.

1. **P. abyssinica,** *Schultz Bip. in Flora* xxii. p. 20 (1839). Root-stock somewhat thickened. Stems nearly naked, 3–12 in. long, simple or sparingly branched, more or less hispid, at apex somewhat pubescent. Radical or subradical leaves oblanceolate, obtuse, narrowed towards base into a short petiole, distantly toothed, hispid on both sides, 1½–6 in. long; stem-leaves few, mostly linear, smaller. Capitula ⅔–¾ in. long in flower, ½ in. long in fruit, on long peduncles or pedicels, solitary or in a very lax paniculate cyme. Involucral bracts puberulous and along the mid-line of the back hispid; the outermost short. Achenes ⅛–⅕ in. long, striate-costate longitudinally, obscurely ridged transversely, not tapering at the apex into a beak. Pappus about ¼ in. long, alike on all the achenes.—Schultz Bip. in Mus. Senckenb. iii. p. 58; A. Rich. Fl. Abyss. i. p. 460.

Nile Land. Abyssinia, *Schimper!*
Abyssinian name "Zeediet" or "Zatett."

111. **CREPIS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 513.

Capitula homogamous; florets all ligulate. Involucre campanulate or at first tubular-campanulate; inner bracts 1-seriate subequal more or less setulose or carinate on the back; outer bracts shorter lax. Receptacle naked or shortly fimbrilliferous. Achenes subterete or obtusely angular, costate, narrowed above into a beak; pappus finely setose, copious, simple.—Herbs with radical or alternate often amplexicaul cauline leaves and solitary or variously cymose capitula.

A considerable genus, chiefly of the Northern Hemisphere.

Inner involucral bracts after flowering with a thickened keel at the base.	
Inner involucral bracts about 13. Pappus somewhat sordid.	
Perennial.	
Stems tall, rigid, scabrid, leafy	1. *C. Schultzii.*
Stems slender, weak, hispidulous, with few leaves.	
Radical leaves petiolate	2. *C. carbonaria.*
Radical leaves attenuate to the sessile base	3. *C. Newii.*
Annual	4. *C. Schimperi.*
Inner involucral bracts 8. Pappus white or nearly so	5. *C. Rueppellii.*
Inner involucral bracts unchanged after flowering.	
Inner involucral bracts 13; midrib pale	6. *C. achyrophoroides.*
Inner involucral bracts 8; midrib black	7. *C. Hookeriana.*

Crepis nivalis, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 284, name only, from Abyssinia, and *Brachyderæa xylorrhiza,* Schultz Bip. *l. c.*, p. 283, name only, also from Abyssinia, are unknown to us.

1. **C. Schultzii,** *Hochst. in Herb. Schimp.* ii. n. 861. Erect scabrous herb, 3–4 ft. high, often branched at the base. Stems simple below, angular, hispid-scabrous. Leaves oval-oblong or the upper ones lanceolate, obtuse or subacute, mucronate, denticulate, hispidulous, ranging up to 12 by 2 in.; the radical ones attenuate at the base, subpetiolate; the stem-leaves broad at the base, sessile, semi-amplexicaul.

Capitula about $\frac{1}{2}$ in. long, on pedicels ranging up to 1 in., in rather dense cymes. Inner involucral bracts about 13, lanceolate, hispid with black and green hairs; outer bracts narrow, shorter. Achenes $\frac{1}{4}$ in. long, costate, attenuate at apex into a beak. Pappus $\frac{1}{4}$ in. long, sordid.—*Barkhausia Schultzii*, Hochst. *l. c.*; A. Rich. Fl. Abyss. i. p. 464; *Brachyderæa Schultzii*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 283.

Nile Land. Abyssinia, *Schimper!*

2. **C. carbonaria,** *Schultz Bip. in Flora* xxii. 19 (1839), *et in Mus. Senckenb.* iii. 54 (1839). Slender shining puberulous perennial herb, 6–15 in. high. Radical leaves numerous, diffuse, obtuse, apiculate, runcinately toothed or pinnatifid, membranous, on petioles of $\frac{1}{2}$–4 in., altogether about double as long, terminal lobe $\frac{1}{6}$–$1\frac{1}{3}$ in. wide, the other lobes small; stem-leaves very few, narrower. Capitula $\frac{1}{2}$–$\frac{2}{3}$ in. long, solitary or few together, pedunculate. Inner involucral bracts 13, linear-lanceolate, subobtuse, thinly tomentose and hispid with black hairs; outer bracts smaller. Achenes about $\frac{1}{4}$ in. long, attenuate at apex into a slender beak. Pappus subsordid, $\frac{1}{6}$ in. long—*Barkhausia carbonaria*, A. Rich. Fl. Abyss. i. p. 465; *C. tenerrima*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 677; *B. tenerrima*, A. Rich. Fl. Abyss. i. p. 464; *Brachyderæa carbonaria* and *B. tenerrima*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 283.

Nile Land. Abyssinia, alt. 10,500 ft., *Schimper!*

3. **C. Newii,** *O. & H.* Perennial. Rootstock thick. Flowering stems scabrous-hispid and puberulous, nearly leafless above the base, about $1\frac{1}{2}$ ft. high. Radical leaves obovate, cuspidate, dentate with acute backward teeth, attenuate to the sessile base, hispid especially on the midrib on both sides, 3–4 in. long, about 1 in. wide. Capitula $\frac{1}{2}$–$\frac{2}{3}$ in. long, on pedicels of $1\frac{1}{2}$–3 in. long, about 5 in a lax corymbose cyme. Inner involucral bracts 13, linear-lanceolate, obtuse, shortly pubescent and sparingly hispid along the back; outer bracts smaller. Pappus subsordid, $\frac{5}{16}$ in. long.

Mozamb. Distr. Kilima-njaro? *Rev. C. New!*

4. **C. Schimperi,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 295. Hispid annual, simple or branched from the base, 3–15 in. high. Leaves oval or oblong, pinnatifid or dentate, hispid, obtuse or acute, ranging up to $3\frac{1}{2}$ by $1\frac{1}{4}$ in.; the radical ones several, attenuate at base into a short petiole; the stem-leaves fewer; the upper ones sessile, amplexicaul. Capitula $\frac{1}{2}$–$\frac{3}{4}$ in. long., on pedicels of $\frac{1}{3}$–$4\frac{1}{2}$ in., in a lax open cyme. Inner involucral bracts 13, lanceolate, with strongly hispid keel and puberulous; outer bracts shorter. Achenes $\frac{3}{8}$–$\frac{2}{3}$ in. long, attenuate at apex into a beak; pappus $\frac{1}{4}$ in. long, subsordid.—Schultz Bip. in Schweinf. Fl. Æthiop. p. 144; *Barkhausia Schimperi*, Schultz Bip. *l. c.*; A. Rich. Fl. Abyss. i. p. 446; *? Homalocline Schimperi*, Schultz Bip. in Schweinf. et Aschers. Enum. p. 285.

Nile Land. Abyssinia, *Schimper!* 5,700–9,300 ft. alt., *Q. Dillon, Petit.*

5. **C. Rueppellii,** *Schultz Bip. in Flora* xxii. p. 20 (1839), *et in Mus. Senck.* iii. p. 57 (1839). A dwarf perennial, shining, puberulous, 1½–8 in. high. Radical leaves numerous, forming a rosette, oblanceolate, mostly rounded at the apex, denticulate, attenuate at the base, subpetiolate, ¾–4 in. long. Capitula ⅓–⅝ in. long, on pedicels ranging up to 3 in. in pedunculate lax open cymes. Inner involucral bracts 8, narrowly lanceolate, puberulous with small gland-tipped hairs, hispidulous on the keel which is thickened in fruit; outer narrower, shorter. Achenes ⅛ in. long, costate, attenuate at the apex into a beak. Pappus ⅙ in. long, nearly white.—*C. adenothrix*, Schultz Bip. in Herb. Schimp. Abyss. i. n. 217; *Brachyderæa Rüppellii*, Schultz Bip. in Schweinf. Fl. Æthiop. p. 283; *Barkhausia adenothrix*, A. Rich. Fl. Abyss. i. p. 465.

Nile Land. Abyssinia, *Schimper! Rüppell.*

Crepis abyssinica, Schultz Bip. in Flora, 1839, p. 20, et in Mus. Senck. iii. p. 56, i.e. *Brachyderæa abyssinica*, Schultz Bip. ex Schweinf. et Aschers. Enum. p. 283, appears from the description to be only a variety of the above, with a divided root, more pubescent scapes, and rather longer ligules; it was also gathered by Rüppell in Abyssinia.

6. **C. achyrophoroides,** *Vatke in Linnæa*, xxxix. p. 514 (1875). An erect pallid subscabrous perennial herb, about 4 ft. high. Stem simple or nearly so, terete, striate. Radical leaves obovate, obtuse or cuspidate, erect, attenuate to a scarcely petiolate clasping base, about 5 together, 9–11 by 1¾–2¼ in., denticulate. Stem-leaves few, smaller, ovate or lanceolate, sessile, clasping. Capitula campanulate, about ¾ in. long, few. Inner involucral bracts 13, subobtuse, puberulous; outer pale outside, narrowly elliptical, flat. Ripe achenes not seen; pappus subsordid, ⅓ in. long.

Nile Land. Abyssinia, *Schimper!*

7. **C. Hookeriana,** *O. & H.* Hispidulous perennial herb, 1–2 ft. high. Stems erect or ascending, somewhat angular, striate-sulcate, leafy at base, with few leaves above. Subradical leaves oblanceolate, rounded at the apex, attenuate at the base into a short petiole, retrorsely denticulate, 6–8 in. long; upper leaves lanceolate, sessile, amplexicaul, acute, smaller. Capitula ⅔–¾ in. long, on bracteolate pedicels of 2–8 in., in a very lax open 2–4-headed cyme. Inner involucral bracts 13, linear-lanceolate, flat, puberulous; midrib black on the back; outer bracts smaller. Achenes ¼ in. long or rather more, attenuate at apex into a beak. Pappus sordid, scarcely ¼ in. long. Receptacle shortly fimbrilliferous.—*Anisoramphus hypochæroides*, Hook. f. in Journ. Linn. Soc. Lond. vii. p. 204; vix DC.

Upper Guinea. Cameroon Mountains, 7,000–13,500 ft. alt., *Mann!*

112. **LACTUCA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 524.

Capitula homogamous, ligulate. Involucre cylindrical, usually narrow in flower, broader in fruit; bracts in few rows, imbricated, with scarious margins; the innermost elongated, subequal. Receptacle flat, naked. Ligule truncate, 5-dentate at the apex. Anther-base

sagittate; auricles acute or shortly setaceous-acuminate. Achenes oval or oblong, all similar, more or less compressed, narrowed at the base, terminating in a short beak or long neck, 4–10-costate. Pappus copiously setose, in many rows, persistent or deciduous in one piece.—Herbs, usually glabrous, with milky sap, alternate or radical leaves and yellow or blue flowers.

A considerable genus, widely spread over the Old World and North America.

The lettuce, *L. sativa*, Linn., is cultivated in Nubia, Cordofan and Abyssinia.

L. albiflora, Schultz Bip. in Schweinf. and Aschers. Enum. 285, from Sennaar, is unknown to us.

Achenes fusiform, about 10-costate, tapering to a short beak (*Brachyrhamphus*).
- Inner involucral bracts 5 . . . . . 1. *L. taraxacifolia.*
- Inner involucral bracts 8 . . . . . 2. *L. goræensis.*

Achenes compressed, with thickened margin, 1 central vein on each side, and very short beak . . . . . 3. *L. Schweinfurthii.*

Achenes compressed, terminating in a long slender neck (*Scariola*).
- Achenes 1-ribbed on each side.
  - Stem somewhat flexuous . . . . . 4. *L. capensis.*
  - Stem straight rigid . . . . . 5. *L. abyssinica.*
- Achenes with several ribs on each side.
  - Habit erect or ascending, not scandent.
    - Inflorescence elongated. Pappus white. Usually somewhat setose-scabrid . . . . . 6. *L. virosa.*
    - Inflorescence diffuse or short. Pappus yellowish.
      - Usually smooth.
        - Heads numerous . . . . . 7. *L. Hochstetteri.*
        - Heads fewer, distant . . . . . 8. *L. rariflora.*
  - Habit scandent.
    - Nearly glabrous . . . . . 9. *L. paradoxa.*
    - Hispid-glandular . . . . . 10. *L. glandulifera.*

1. **L. taraxacifolia,** *Schum. & Thonn. Beskr. Guin. Pl.* p. 380. Root simple. Stem erect, glabrous, terete, glaucescent, unarmed, 2–6 ft. high, simple below, with a cluster of leaves at the base. Leaves runcinate, the upper rather acute, the lower rather obtuse, glabrous or nearly so, ranging up to more than 6 by 4 in.; stem-leaves sessile, amplexicaul, the lowest ones narrowed into a short winged petiole; lobes variable in breadth and depth, denticulate; teeth usually callous, acute, like small prickles. Capitula about 20-flowered, $\frac{2}{3}$–$\frac{1}{2}$ in. long, on very short pedicels, in panicled racemose cymes. Inner involucral bracts 5, obtuse, linear-oblong; outer bracts imbricated, ovate, obtusely pointed, with scarious margins, varying up to about half the length of the inner ones. Achenes dark, about 10-costate longitudinally, transversely rugulose, fusiform, $\frac{1}{8}$–$\frac{3}{16}$ in. long, tapering to a short slender pale apex. Pappus $\frac{1}{5}$ in. long, nearly white.—DC. Prodr. vii. p. 138. Schultz Bip. in Flora 1842, p. 422. *Sonchus taraxacifolius*, Willd. Sp. Pl. iii. p. 1511. *S. serratus*, Perr. ex DC. l. c. *Microrhynchus pentaphyllus*, Hochst. in Herb. Kotsch. Nub. n. 337. *L. pentaphylla*, Schultz Bip. and *L. Kotschyi*, Schultz Bip. in Linnæa xv. p. 725 (1841). *S. pentaphyllus*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 160.

Upper Guinea. Guinea, *Thonning* (native name, "Abloge"); Senegambia, Richard-tol, *Perrottet!* Niger, *Barter!* (a troublesome weed, flowers yellow).

North Central. Kouka, *E. Vogel!*

Nile Land. Sennaar, *Kotschy!* Chartum, *Schweinfurth!*

2. **L. goræensis,** *Schultz Bip. in Flora* 1842, p. 422. Erect glabrous or subglabrous glaucescent annual or biennial, 1–3 ft. high or more, branched at least above. Stem and branches terete. Leaves pinnatifid, often runcinate, mostly acute, ranging up to 8 by 4 in., sessile, amplexicaul or the lowest ones narrowed into a short winged petiole; lobes variable in breadth and depth, denticulate-ciliate. Capitula $\frac{1}{2}$–$\frac{3}{4}$ in. long, on very short pedicels, in panicled racemose cymes. Inner involucral bracts 8, linear-lanceolate, scarcely acute or obtuse, with scarious margins; outer bracts ovate imbricated, much shorter also with scarious margins. Flowers yellow. Achenes $\frac{1}{8}$–$\frac{1}{6}$ in. long, dark, fusiform, tapering to a short pale slender apex, about 10-costate, transversely rugulose. Pappus white, $\frac{1}{5}$–$\frac{1}{4}$ in. long.—*Sonchus goræensis*, Lam. Enc. Méth. Bot. iii. p. 397. *Brachyramphus goræensis*, DC. Prodr. vii. p. 177. *S. ciliatus*, Perr. ex DC. l. c. *Microrhynchus octophyllus*, Hochst. in Herb. Kotsch. Nub. n. 406. *L. octophylla*, Schultz Bip. and *L. nubica*, Schultz Bip. in Linnæa xv. p. 725 (1841). *M. Hochstetteri*, Schultz Bip. ex Hochst. in Herb. Schimp. Abyss. iii. n. 1448 (variety with narrow leaf-lobes). *L. Petitiana*, A. Rich. Fl. Abyss. i. p. 462. *S. Hochstetteri*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 160.

Upper Guinea. I. Gorée, *Sparrman;* Senegambia, Walo, *Perrottet;* Mount Chassaniol, *Thierry* (fide Klatt in Ann. Sc. Nat., ser. v. xviii. p. 377).

Nile Land. Cordofan, *Kotschy!* Abyssinia, *Schimper! Ehrenberg!* altitude 5–7,000 feet.

Mozamb. Distr. Zanzibar Island, *Hildebrandt!*

3. **L. Schweinfurthii,** *O. & H.* A strict herb, 5 ft. high or more. Stem erect, straight, striate, terete, puberulous below, leafy, simple. Stem leaves lanceolate or lanceolate-oblong, undivided, denticulate, glabrous or nearly so, membranous, sessile, ranging up to 8 by 2 in. or more, semi-amplexicaul; the lower ones narrowed towards base, obtuse and mucronate; the upper ones wide and sub-auriculate at base, acute. Capitula cylindrical, $\frac{3}{8}$–$\frac{1}{2}$ in. long, 5-flowered, on pedicels ranging up to $\frac{1}{2}$ in., in an elongated cyme. Inner involucral bracts 5, narrowly lanceolate, obtuse, glabrous or nearly so. Achenes oval, compressed, reddish brown, $\frac{3}{16}$ in. long; margins thickened, sides each with a central vein, glabrous, nearly smooth; beak very short. Pappus $\frac{1}{4}$ in., white, soft, caducous from a basal ring.

Nile Land. Bongo-land, *Schweinfurth!* in woods.

4. **L. capensis,** *Thunb. Fl. Cap., ed Schultes,* p. 614. Glabrous perennial herb, $\frac{1}{2}$–2 ft. high or more. Stem terete, branched, leafy, erect or somewhat decumbent at base and flexuous, erect above. Leaves linear or oblong, smooth; the lower ones runcinate-pinnatifid or entire, acuminate, 3–5 in. long; the upper mostly entire, lanceolate or linear-lanceolate, sessile, amplexicaul, sagittate. Capitula $\frac{3}{8}$–$\frac{3}{4}$ in. long, few-

11-flowered, on bracteolate pedicels ranging up to 1½ in. long, in a loosely panicled cyme. Flowers white or yellow or blue. Inner involucral bracts usually 8. Achenes compressed, dark brown, 1-ribbed on each side, with a long pale neck at top. Pappus pale-yellowish or nearly white.—DC. Prodr. vii. p. 136. Harv. Fl. Cap. iii. p. 526, with synonymy.

Upper Guinea. Cameroons Mountains, *Mann!* 5,000–7,500 ft. alt.? Senegambia, *Lelierre!* (young specimens in young flower with rudimentary leaves in Hb. Berol.)

Mozamb. Distr. Between Senna and Lupata, *Kirk!* Shupanga, *Kirk!* Moramballa, *Waller!*

Occurs also in Southern and Eastern districts of the Cape Flora.

5. **L. abyssinica,** *Fresen. in Mus. Senek.* iii. p. 72 (1839), *ex descriptione.* An erect nearly glabrous glaucescent robust herb, 3 ft. high or more. Stem terete, smooth, rigid, straight. Lower leaves pinnatifid- or sinuate-dentate; upper leaves linear-lanceolate, acute, usually undivided, margins quite entire or aculeate-denticulate, sessile, semi-amplexicaul, bi-auriculate, ranging up to 6 in. long, midrib smooth or nearly so, auricles lanceolate, acute, ranging up to ½ in. long or more, entire or denticulate. Capitula ½–⅔ in. long, on short or sometimes elongated bracteolate pedicels, in an elongated or diffuse cyme. Inner involucral bracts 8. Florets 10–13, violet. Achenes dark reddish brown, 1-ribbed on each side, terminating in a pale slender neck about as long as the body. Pappus yellow at base.—A. Rich. Fl. Abyss. i. p. 462.

Nile Land. Sennaar, *Kotschy!* Mittu-land, *Schweinfurth!* Niamniam-land. *Schweinfurth!* Abyssinia, *Schimper! Rüppell.*

6. **L. virosa,** *Linn. Sp. Pl.* ed. i. p. 795 (1753). Erect glaucescent annual or biennial, about 1–3 ft. high. Stem simple up to the inflorescence, usually aculeate-setose below, terete, striate above. Stem-leaves erect-patent, obovate-oblong, undivided, sinuate-toothed or runcinate, sagittate-amplexicaul, sessile, subentire or aculeate-denticulate, 1–4 in. long or more. Capitula ⅓–½ in. long, on very short pedicels, in a cyme with spreading branches. Inner involucral bracts about 8, obtuse. Florets about 11, yellow. Achenes striate, dark brown in *L. virosa* proper, or in *L. Scariola*, Linn., greyish brown, hispidulous near the top of the body, which terminates in a slender beak of nearly the same length. Pappus white or nearly so.

Nile Land. Abyssinia, 6000 ft. alt., *Schimper!* Cordofan, *Kotschy!*

Widely spread over Europe, Egypt, N. India, etc.

Perhaps identical with the Cape species *L. Dregeana*, DC.

L. Serriola, Linn. Cent. ii. Pl. n. 189 (Propos. Torner. June 11, 1756), i.e. *L. Scariola*, Linn. Sp. Pl. edit. ii. p. 1119 (1763), appears to differ from *L. virosa*, only by the less dark achenes.

7. **L. Hochstetteri,** *Schultz Bip. in Herb. Schimp. Abyss.* i. n. 128. Branched perennial, 2–24 in. high or more. Root-stock thick. Branches glabrous, slender, terete. Lower leaves mostly runcinate-dentate, glabrous or puberulous, 1½–3 in. long or more; upper leaves distant, mostly pinnatipartite, with distant lanceolate-linear acute

segments. Capitula $\frac{2}{5}$–$\frac{3}{5}$ in. long, 5-flowered or in the variety 3–5-flowered, on pedicels ranging up to 1–3 in., in a repeatedly branched cyme. Inner involucral bracts usually 5. Achenes compressed, striate, black with long pale neck at top. Pappus of a golden colour.—*Pyrhopappus Hochstetteri*, A. Rich. Fl. Abyss. i. p. 463.

Nile Land. Abyssinia, *Schimper ! Petit !*

Var. *humilis*. Dwarf. Leaves entire or dentate-runcinate. Heads 3–5-flowered. *Lactuca humilis*, Schultz Bip. l. c. ii. n. 1172. *Pyrhopappus humilis*, A. Rich. l. c.

Nile Land. Abyssinia, *Schimper !*

8. **L. rariflora,** *Fresen. in Mus. Senckenb.* iii. p. 73 (1839). Stem glabrous, dichotomously branched. Leaves runcinate denticulate or undivided and linear, terminal part elongated, linear, acuminate, pilose on the midrib beneath; the upper ones sagittate-amplexicaul; auricles elongated, lanceolate-linear, acuminate. Capitula about $\frac{1}{2}$ in. long, about 8-flowered, distant, on bracteolate pedicels, in a dichotomous cyme. Inner involucral bracts linear. Achenes oblong, striate on both sides, $\frac{1}{6}$ in. long, terminating in a beak about one-third or one-fourth as long as the body. Pappus $\frac{1}{4}$ in. long, yellowish below, white above.—A. Rich. Fl. Abyss. i. p. 461.

Nile Land. Abyssinia, *Rüppell.*

9. **L. paradoxa,** *Schultz Bip. in Hb. Schimp. Abyss.* ii. n. 1320. Nearly glabrous glaucescent climbing herb, with diffuse divaricate branches. Uppermost leaves sessile, amplexicaul, ovate; lower leaves with a large hastate-ovate terminal lobe, with one ovate or oblong lateral lobe on each side separated from the terminal lobe by the narrowly winged midrib, and with a narrowly winged amplexicaul petiole, altogether 1–4 by $\frac{1}{3}$–2 in. Capitula $\frac{3}{8}$–$\frac{5}{8}$ in. long, 6–11-flowered, on pedicels of $\frac{1}{12}$–$1\frac{1}{2}$ in., in lax diffuse cymes. Inner involucral bracts 4–8. Ovaries striate, pale, subterete, tapering towards apex. Pappus white.—A. Rich. Fl. Abyss. i. p. 461. *Pertya paradoxa*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 153.

Nile Land. Abyssinia, *Schimper !* 8–9000 ft. alt.

10. **L. glandulifera,** *Hook. f. in Journ. Linn. Soc. Lond.* vii. p. 203. Hispid-glandular, climbing herb, 8–15 ft. high. Stems flexuous, with spreading branches. Leaves hastate-ovate in the upper part, below the middle suddenly constricted nearly to the midrib, then with a lateral lobe on each side and ending towards the base in a broadly winged amplexicaul auriculate petiole, altogether 1–3 by $\frac{1}{3}$–$1\frac{1}{3}$ in., acute or apiculate, denticulate; the uppermost leaves undivided. Capitula $\frac{3}{5}$–$\frac{3}{4}$ in. long, 5-flowered, subsessile or pedicellate, in much branched divaricate cymes. Inner involucral bracts 5, linear-lanceolate. Achenes compressed, with 4 elevated almost winged ribs on each side, pale brown, terminating in a long neck. Pappus white.

Upper Guinea. Cameroon Mountains, 7–8000 ft. alt., *Mann !*

Brachyrhamphus (Lactuca) *Schimperi*, Schultz Bip., i.e. *Sonchus Spachii*, Schweinf. Beitr. Fl. Æthiop. pp. 283, 307, names only, from Nubia, is unknown to us.

113. **HETERACHÆNA**, Fresen.; Benth. et Hook. f. Gen. Pl. ii. p. 526.

Capitula homogamous, ligulate. Involucre cylindrical, at length thickened at the base; inner bracts narrow, elongated, equal, membranous; the outer ones few, small. Receptacle flat, naked. Ligule truncate, 5-dentate at the apex. Anthers sagittate at the base; auricles acute or shortly setaceous-acuminate. Style-branches slender. Outer achenes narrow, dorsally compressed, ∞-costate, transversely rugulose, attenuate at the base, contracted at the apex into a very short beak; the inner achenes narrow, subterete, 4–5-costate, smooth. Pappus copiously setaceous, smooth, persistent or deciduous in one piece.—An annual glabrous herb, dichotomously branched, with alternate leaves and blue flowers.

A monotypic genus.

1. **H. massaviensis,** *Fresen. in Mus. Senckenb.* iii. p. 74 (1839). A slender delicately branched annual 1–2 ft. high; branches terete glaucescent. Stem-leaves runcinate, more or less deeply pinnatifid or undivided, cordate, auriculate-amplexicaul, sessile, denticulate, often ciliately so, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long; radical leaves petiolate. Capitula narrowly oblong, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 9–10-flowered, on slender pedicels of $\frac{1}{4}$–1 in., in a lax corymbosely paniculate cyme. Inner involucral bracts 5, narrowly lanceolate, obtuse. Achenes $\frac{1}{9}$–$\frac{1}{8}$ in. long.—*Lactuca massaviensis*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 1045, iii. n. 1462; A. Rich. Fl. Abyss. i. p. 460; *Sonchus massaviensis*, Schultz Bip. in Schweinf. Beitr. Fl. Æthiop. p. 160; *Brachyramphus lactucoides*, T. Anders. in Journ. Linn. Soc. Lond. Bot. v. Suppl. i. p. 23.

Nile Land. Abyssinia, *Schimper! Ehrenberg!* Somali, *Hildebrandt*, fide Vatke in Oesterr. Bot. Zeitschr. 1875, p. 329.
Occurs also in Arabia.

114. **REICHARDIA**, Roth, Bot. Abh. p. 35 (1787); (*Picridium*, Desf.; Benth. et Hook. f. Gen. Pl. ii. p. 527.)

Capitula homogamous, ligulate. Involucre campanulate; bracts in many rows, imbricated; the outer ones gradually shorter, broader, scarious-margined. Receptacle flat, naked. Ligule truncate, 5-dentate at the apex. Anther-base sagittate; auricles shortly setaceous-acuminate. Style-branches slender. Achenes glabrous, oblong, subterete, 4–5-costate, transversely rugose, slightly constricted but not beaked at the apex. Pappus copiously setaceous, smooth, white, deciduous in one piece.—Erect glabrous herbs, with alternate or radical toothed or pinnatifid leaves, capitula on long peduncles, and yellow flowers.

A genus of a few species, chiefly inhabiting the Mediterranean region.

1. **R. tingitana,** *Roth Bot. Abh.* p. 35 (1787). Erect annual (at least as to our specimens) 1–2 ft. high. Leaves oblong oblong-ovate or lanceolate or the lower ones obovate, undivided or pinnatifid,

usually denticulate, sessile, 1½–6 in. long or the uppermost smaller, mostly cordate semiamplexicaul. Capitula ½–1 in. long. Involucral bracts broadly ovate ¼–⅜ in. long.—Ascherson in Schweinf. Beitr. Fl. Æthiop. p. 154; *Picridium tingitanum*, Desf. Fl. Atl. ii. p. 220 (1800); DC. Prodr. vii. p. 182, cum syn.; *P. arabicum*, Hochst. et Steud. in Herb. Schimp. Arab. n. 833; DC. l.c.; A. Rich. Fl. Abyss. i. p. 466.

Nile Land. Abyssinia, *Schimper! Q. Dillon, Hildebrandt!* Nubia fide Schweinf. et Aschers. Enum. p. 286.

Widely spread under various forms in the Mediterranean region; occurs also in N.W. India.

115. **DIANTHOSERIS,** Schultz Bip.; Benth. et Hook. f. Gen. Pl. ii. p. 527.

Capitula homogamous, ligulate. Involucre broadly campanulate or hemispherical or cylindrical; bracts imbricated. Receptacle flat, naked. Ligule truncate, 5-dentate at the tip. Anther-base sagittate; auricles acute or shortly setaceous-acuminate. Style-branches slender. Achenes (immature) ∞-costate, smooth, slightly constricted not beaked at the apex. Pappus copiously setose, smooth.—Dwarf or acaulescent herbs with fusiform roots, crowded leaves passing into the involucral bracts and yellow flowers.

A genus peculiar to this Flora.

Capitula many-flowered, sessile	1. *D. Schimperi.*
Capitula 9–10-flowered on short scaly scapes	2. *D. Rüppellii.*

1. **D. Schimperi,** *Schultz Bip. in Flora*, 1842, p. 440; *et in Herb. Schimp. Abyss.* ii. n. 755. Acaulescent perennial herb, with a thick dark tapering rootstock. Radical leaves numerous, in a rosette, spathulate or sublinear, obtuse, subentire or repand-denticulate, 1–1½ in. long. Capitula sessile, broadly campanulate or hemispherical, ½–1 in. diameter, many-flowered. Involucral bracts green, imbricated; the outer ones ovate short; the inner lanceolate-oblong.—A. Rich. Fl. Abyss. i. p. 468.

Nile Land. Abyssinia, *Schimper!*

2. **D. Rüppellii,** *Schultz Bip. in Flora*, 1842, p. 440. About 1½ in. high. Leaves numerous, forming a radical rosette, grey-green, lanceolate or linear-lanceolate with a callous tip and whitish callous teeth, glabrous, the larger to about 1 in. in length by 1½ lines broad. Scape under ½ in. with numerous lanceolate and ovate-lanceolate acuminate white-bordered squamæ, more numerous above and passing into the involucre. Capitula 9–10-flowered. Involucre cylindrical about 2 lines broad, scales glabrous, the outer much shorter than the inner, ovate and elongate-lanceolate with broad white membranous margins and herbaceous midrib which is thickened below; inner long bracts 5–8, linear-lanceolate. Corollas yellow when dry, red beneath.—Fresenius in Mus. Senck. iii. 77 (description without name).

Nile Land. Abyssinia, *Rüppell.*
Description taken from Fresenius, l.c.

116. **SONCHUS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 528.

Capitula homogamous, ligulate. Involucre campanulate oblong or cylindrical, at length usually thickened at the base; bracts in several rows, the innermost ones usually longer and subequal, the outer short imbricated. Receptacle flat, naked. Ligule truncate, 5-dentate at the apex. Anther-base sagittate; auricles shortly setaceous-acuminate. Style-branches slender. Achenes obovoid-oblong or narrow, more or less compressed rarely subterete, 10–20-costate or -striate, somewhat narrowed at both ends, not beaked. Pappus copiously setose, fine, smooth, usually white, deciduous in one piece.—Herbs sometimes shrubby at the base, with alternate or radical leaves and yellow flowers.

A genus of about 24 species widely spread especially over the Old World.

Boissier, Fl. Orient. iii. p. 797, gives the widely spread Mediterranean and Levant species, *Sonchus tenerrimus*, Linn., as extending to Abyssinia.

Capitula many-flowered; inner involucral bracts numerous.
  Annual.
    Leaves oval or oblong. Capitula subglabrous. Achenes oblong . . . . . 1. *S. oleraceus.*
    Leaves lanceolate-linear. Capitula woolly at the base. Achenes obovate.
      Involucral bracts setose-hispid . . . . . 2. *S. angustissimus.*
      Involucral bracts glabrous or somewhat woolly at the base, not setose-hispid . . . . . 3. *S. Schweinfurthii.*
Capitula 8–27-flowered; inner involucral bracts 5–10.
  Perennial.
    Loosely branched.
      Achenes transversely scabrid-rugulose or squamulose.
        Pedicels slender . . . . . 4. *S. Bipontini.*
        Pedicels rigid, not slender.
          Capitula 20–27-flowered, rather numerous . . . 5. *S. cornutus.*
          Capitula about 13-flowered, few . . . . . 6. *S. Brunneri.*
      Achenes smooth . . . . . 7. *S. prenanthoides.*
    Closely branched. Achenes smooth.
      Habit bushy. Capitula 20–25-flowered . . . . . 8. *S. melanolepis.*
      Habit virgate. Capitula about 8-flowered . . . . 9. *S. rarifolius.*

1. **S. oleraceus,** *Linn. Sp. Pl.*, edit. i. p. 794 (1753). A coarse erect annual, 1½–3 ft. high. Stem glaucescent striate branched above. Leaves oval or oblong, undivided or runcinate or pinnatifid, usually aculeate-denticulate, 1–6 in. long; those of the stem sessile amplexicaul auriculate. Capitula campanulate, about ½ in. long exclusive of the flowers, many-flowered, on rather short usually setose-glandular pedicels, in corymbose cymes. Inner involucral bracts numerous, subglabrous, linear-lanceolate, subobtuse. Achenes compressed, obovate, 10–15-striate, brown, ⅛ in. long, transversely rugose in *S. oleraceus* proper or in the subspecies *S. asper*, All. (*S. spinosus*, Lam.) without transverse rugosities.—A. Rich. Fl. Abyss. i. p. 467; *S. macrotus*, Fenzl in Flora, 1844, p. 312; *S. Schimperi*, A. Br. et Bouché App. Ind. Sem. Hort. Berol. 1857, p. 1.

Nile Land. Abyssinia, *Schimper!* Nubia, *Kotschy!* Karagué and Unyoro, *Speke and Grant!* Sennaar and Ukereve-land.

A cosmopolitan weed.

2. **S. angustissimus,** *Hook. f. in Journ. Linn. Soc. Lond. Bot.* vii. p. 203. A robust erect herb 4–6 ft. high. Stem terete, striate, glaucescent, glabrous, hollow. Leaves from a sessile hastate-lanceolate base attenuate into a long linear acute apex, glabrous, ranging up to nearly a foot long; margins with aculeate denticulations directed downwards, undivided or with a few linear lateral lobes. Capitula campanulate, $\frac{3}{4}$ in. long, many-flowered, woolly at base, on mostly short pedicels in an elongating cyme usually umbelliform at top. Involucral bracts linear or broader, obtuse, setose-hispid and the exposed ones somewhat woolly on midrib, imbricated, in many rows, unequal. Achenes compressed, smooth, $\frac{1}{8}$ in. long, 12–15-costate; 4 of the ribs larger than the rest. Pappus $\frac{3}{8}$ in. long, soft, white.

Upper Guinea. Cameroon Mountains, *Mann!* 7–8000 ft. alt.

3. **S. Schweinfurthii,** *O. & H.* Probably annual. Stem erect, glabrous, striate, glaucescent, hollow, but little branched, 3 ft. high or more. Stem-leaves linear-lanceolate, entire or occasionally with a few large lateral lobes, sessile, semi-amplexicaul, auriculate, acute, minutely denticulate, glabrous, glaucescent, ranging up to 9 by 2 in.; auriculate, auricles acute or apiculate, ranging up to $\frac{2}{3}$ in. Capitula widely campanulate, $\frac{2}{3}$ in. long, many-flowered, on unequal rather slender pedicels, in a subumbelliform cyme. Inner involucral bracts numerous narrowly lanceolate subobtuse glabrous; outer somewhat woolly, not setose-hispid. Achenes oblong, $\frac{1}{8}$ in. long, about 10-ribbed, 4 of the ribs stronger than the rest, somewhat rugulose, scarcely compressed. Pappus white, soft, $\frac{2}{5}$ in. long. Receptacle $\frac{1}{3}$ in. diameter.

North Central. Monbuttu-land (flowers pale yellow), *Schweinfurth!*

4. **S. Bipontini,** *Aschers. in Schweinf. Beitr. Fl. Æthiop.* p. 160. Perennial. Stem erect, somewhat shrubby at the base, branched at least above, 2–4 ft. high or more, glabrous; branches rather slender, mostly divaricate. Leaves linear or nearly so and undivided (except in the variety β), usually acute, minutely denticulate, ranging up to 6 by $\frac{2}{5}$ in. or more, sessile, (in the type) shortly auriculate at base except the uppermost ones. Capitula $\frac{3}{8}$–$\frac{1}{2}$ in. long, apparently about 20-flowered, or rarely fewer, narrowly cylindrical, obsoletely tomentose at the base, on short or somewhat elongated slender glabrate or puberulous pedicels, in a lax corymbose cyme. Inner involucral bracts about 8, linear or linear-oblong, obtuse, ultimately reflexed. Achenes $\frac{1}{10}$ in. long, about 10-striate, rough. Pappus $\frac{1}{3}$ in. long.—*S. lactucoides*, Schultz Bip. in Herb. Schimp. Abyss. ii. n. 1299; A. Rich. Fl. Abyss. i. p. 467; non Bunge.

Nile Land. Abyssinia, *Schimper!* Djur-land, *Schweinfurth!*
Mozamb. Distr. Sena, *Peters!*
Var. *β? pinnatifidus*, O. & H. Stem-leaves deeply pinnatifid, sessile, auriculate or toothed at the base, ranging up to 8 in. long; lateral lobes patent, linear-lanceolate, acute, about 2 pairs, the largest ranging up to 2 in. or more; terminal lobe larger.—*Lactuca* (sp.), T. Thoms. in Speke, Journ., App. p. 638; *Microrhynchus* (sp.?), Oliv. in Trans. Linn. Soc. Lond. xxix. p. 104.

Nile Land. Djur-land, in open fields, near Seriba Ghattas, *Schweinfurth!* White Nile, N. Lat. 8° 45′, the Mularto of the Arabs, *Petherick!*

Mozamb. Distr. Zanzibar, *Goodwin!* Lower Valley of the Shire, *Meller! Stewart!* 7½° S. Lat. Used as spinach, *Speke and Grant!* Inhambane, *Peters!*

Perhaps a distinct species.

Var.? *exauriculatus*, O. & H. Leaves without auricles, undivided, sometimes obtuse.

Nile Land. Djur-land. Heads about 20-flowered, leaves acute, *Schweinfurth!*

? Mozamb. Distr. Zanzibar. Heads about 11-flowered. Leaves obtuse, apiculate, *Hildebrandt!*

These specimens again may form either one distinct species or possibly two independent species, instead of a variety of the above species.

5. **S. cornutus,** *Hochst. in Herb. Kotsch. Nub.* n. 157. Erect perennial herb, ½–2 ft. high or more. Branches rather divaricate. Leaves crowded near the base of the stem, obovate, spathulate or pinnately lobed or toothed, apiculate, mostly narrowed at the base, sessile, occasionally subauriculate, denticulate, 1–8 by ¼–3⅔ in. Capitula campanulate-oblong, 20–27-flowered, ⅖–⅗ in. long, on bracteolate pedicels of ⅕–1¼ in., in rather lax divaricate cymes. Inner involucral bracts 8–10, nearly glabrous, obtuse; outer shorter. Achenes ⅛–⅙ in. long, drab, about 10-striate, transversely scabrid-rugulose. Pappus white, soft, ¼ in. long.

Nile Land. Cordofan, *Kotschy!* Gallabat, *Schweinfurth!* White Nile, *Schweinfurth!* Between Suakin and Berber, *Schweinfurth!*

6. **S. Brunneri,** *O. & H.* A low shrubby herb, with glabrous horizontal branches. Leaves spathulate or linear obtuse glabrous sessile semi-amplexicaul, mostly auriculate, entire, 1–3 in. long. Capitula oblong, apparently about 13-flowered, ½–¾ in. long, on bracteolate pedicels of ½–2 in. long, few together, in lax cymes. Inner involucral bracts about 8, lanceolate, more or less scarious. "Achenes tetragonous elongated not attenuate at the apex, angles subacute, striate, the inner ones densely squamulose." Pappus subtawny, ⅜ in. long.—*Rhabdotheca Brunneri*, Webb in Hook. Niger. Fl. p. 147 note; *Microrhynchus Brunneri*, Walp. Ann. ii. p. 976.

Upper Guinea. Senegambia, Sôr Island, *Brunner!*

7. **S. prenanthoides,** *O. & H.* Pale perennial herb, 1–3 ft. high, divaricately branched, glabrous, glaucous, leafy at the crown of the root, sparingly so above. Leaves pinnatifid-dentate or the upper ones subentire, oblong, narrowed towards the amplexicaul base; the lower ones 2–6 in. long, scarcely petiolate; the upper ones smaller, sessile, auriculate. Capitula oblong, ½–¾ in. long, 20–25-flowered, on bracteolate pedicels of ½–1½ in., in a divaricate cyme. Inner involucral bracts about 5, lanceolate, scarious. Achenes ¼–⅓ in. long, subterete, slender, somewhat tapering upwards, smooth, 10-costate. Pappus soft, ⅓–⅜ in. long.—*Zollikoferia prenanthoides*, Hochst. in Herb. Kotsch. Nub. n. 427; *Rhabdotheca prenanthoides*, Schultz Bip. in Aschers. Enum. p. 286.

North Central. Kouka, *E. Vogel!*
Nile Land. Cordofan, *Kotschy!*

8. **S. melanolepis.** *Fresen. in Mus. Senckenb.* iii. 76 (1839). Perennial, shrubby below, much branched, about a foot high. Leaves narrowly runcinate or (in the variety) linear and entire, glabrous, glaucescent, sessile, more or less auriculate at the base, ranging up to 3 in. long. Capitula campanulate-oblong, dark, $\frac{3}{8}$–$\frac{1}{2}$ in. long, 20–25-flowered, actually or obsoletely tomentose and often black-setose at base, on short pedicels 2–3 together at the ends of the slender shoots. Inner involucral bracts about 8, linear, obtuse, nearly glabrous, somewhat compressed, smooth, about 10-striate, $\frac{1}{10}$ in. long, drab-brown. Pappus $\frac{1}{5}$ in. long, soft, white.—A. Rich. Fl. Abyss. i. p. 467.

Nile Land. Abyssinia, *Schimper! Rüppell!*

9. **S. rarifolius,** *O. & H.* An erect twiggy perennial from thick shrubby sometimes woolly crown, 1–2$\frac{1}{2}$ ft. high. Stems slender, glabrous, dichotomous; branches at an acute angle. Leaves few, lanceolate, glabrous or puberulous, entire or aculeate-denticulate, $\frac{1}{8}$–$\frac{3}{8}$ in. long, sessile. Capitula narrowly cylindrical, $\frac{1}{2}$–$\frac{2}{3}$ in. long, about 8-flowered, on slender pedicels in a much branched cyme. Inner involucral bracts linear, obtuse, 6–8. Achenes linear, scarcely compressed, smooth, $\frac{1}{4}$ in. long, about 10-striate, narrow, pale brown. Pappus $\frac{1}{4}$–$\frac{1}{2}$ in. long.

Upper Guinea. Niger Expedition, at Nupe, *Barter!*
Mozamb. Distr. Zomba and East end of Lake Shirwa, *Meller!*

117. LAUNÆA, Cass. in Dict. Sc. Nat. xxv. p. 321 (*Microrhynchus*, Less.; Benth. et Hook. f. Gen. Pl. ii. p. 528.)

Capitula homogamous, ligulate. Involucre campanulate oblong or cylindrical; bracts in many rows, imbricate, usually with scarious margins, the inner ones subequal, the outer ones shorter. Receptacle flat, naked. Ligule truncate, 5-dentate at the apex. Anther-base sagittate, auricles acute or shortly setaceous-acuminate. Style-branches slender. Achenes narrow, not compressed, 4–5-costate, truncate at the apex. Pappus copiously setose, fine, white, smooth, deciduous in one piece.—Glabrous herbs with mostly radical leaves and yellow flowers.

A genus of about 20 species, extending from South Africa and the Canary Islands to India.

Rhabdotheca Rueppellii, Schultz Bip. in Schweinf. et Aschers. Enum. p. 286, name only, from Abyssinia, is unknown to us.

Rhabdotheca chondrilloides, Schultz Bip. *l. c.*, i.e. *Sonchus chondrilloides*, Sibth. Fl. Græc. viii. p. 67, t. 791, is given as common to Egypt and Nubia; it occurs also in other parts of the Mediterranean region, but we have seen no specimen from Tropical Africa.

1. **L. bellidifolia,** *Cass. in Dict. Sc. Nat.* xxv. p. 321 (1822). A glabrous flagelliform perennial herb with long slender simple or occasionally branched prostrate stems from the rosulate crown of the root, often rooting at the nodes. Leaves spathulate or oblanceolate, fasciculate with elongated nodes and often two small scale-like leaves at

the base of the nodes, undivided or sinuate-pinnatifid, obtuse or apiculate, attenuate to a quasi-petiolate base, the radical ones ranging up to 4½ by 1 in.; margins often denticulate. Capitula oblong, ½–⅗ in. long, about 11-flowered, solitary or subsolitary, on bracteate peduncles of ¼–⅔ in., terminal and at ends of short lateral branches. Inner involucral bracts about 8, linear or narrowly oblong. Achenes ⅛–¼ in. long, 4–5-ribbed. Pappus about ¼ in. long, soft, white.—*Prenanthes sarmentosa*, Willd. Phytogr. p. 10, t. 6. f. 2 (1794); *Lactuca sarmentosa*, Wight Contrib. Bot. Ind. p. 27 (1834); *Microrhynchus sarmentosus*, *S. bellidifolius* and *S. Dregeanus*, DC. Prodr. vii. p. 181; *Launæa sarmentosa*, Schultz Bip. mss. in Herb. Hohenack. Ind. Or. n. 193 (anno 1847).

Mozamb. Distr. Kongone mouth of the Zambesi, *Kirk!* Zanzibar Island *Hildebrandt!* Cabaceira, *Peters!*

Occurs also in the Cape, Natal, Madagascar, Mauritius, India and Ceylon.

The following is unknown to us:—

Paleya billotioides, Schultz Bip. *l. c.*, p. 286, name only, from Abyssinia.

The plant "with *Eryngium*-like prickly-toothed single leaves, and large almost *Stifftia*-like heads," referred to by Mr. Bentham in his Memoir on Compositæ (Journ. Linn. Soc. xiii. 546) collected by Afzelius and by Barter on the Niger, in the absence of good flowers we are obliged to leave undetermined. Mr. Bentham suggests it may prove to be the type of a new Mutisiaceous genus near *Dicoma*. It may be *Bojeria glabra*, Klatt, described from a Senegal specimen of Heudelot's (Ann. Sc. Nat. Ser. v. xviii. 364).

UNKNOWN CULTIVATED AND EXCLUDED SPECIES OF COMPOSITÆ.

Aspilia wedeliæformis, Vatke in Osterr. Bot. Zeitschr. xxvii. p. 197 (1877), with short description, from the coast of Zanzibar, is unknown to us.

Harpephora Endlicheriana, Walp. Rep. ii. p. 662, which is probably a species of *Aspilia*, according to Benth. et Hook. f. Gen. Pl. ii. p. 372, has been erroneously stated to come from Tropical Africa.

Helianthus annuus, Linn., is cultivated in Abyssinia and Mozambique.

Spiridanthus, Fenzl. ex Endl. Gen. Pl. Suppl. ii. p. 105, which is according to Benth. et Hook. f. Gen. Pl. ii. p. 400, *Monolopia major*, DC., a Californian herb, was erroneously described by Fenzl as Tropical African.

Cichorium Intybus, Linn., a cosmopolitan herb, is given in Hook. Niger Fl. p. 439 from the island of St. Thomas.

Scorzonera pinnatifida, Lour. Fl. Cochinch. p. 479 (1790), from Mozambique, non Michx. (1820), *S. ? africana*, Poir. Encycl. Méth. Suppl. v. p. 114 (1817), DC. Prodr. vii. p. 126, is unknown to us.

Order LXXIV. GOODENOVIEÆ. (By W. P. Hiern.)

Flowers hermaphrodite, irregular, pentamerous. Calyx-tube adnate to the ovary; limb persistent, partite, cup-shaped or annular. Corolla gamopetalous, inserted on the ovary, oblique; lobes valvate in æstivation, induplicate at the apex. Stamens 5, alternating with the corolla-lobes, inserted at the junction of the base of the corolla with the top of the ovary; anthers free or connate, 2-celled, dehiscing longitudinally. Epigynous disk 0. Ovary 1–2-celled; style simple,

furnished at the apex with a cup-shaped or bilabiate indusium which includes the stigma; ovules 1 or more together, erect or ascending. Fruit inferior, capsular or drupaceous. Seeds solitary or few or numerous; embryo straight, in the axis of rather fleshy uniform albumen; radicle next the hilum.—Shrubs undershrubs or herbs, with sap not milky. Leaves alternate or fasciculate, entire or toothed, exstipulate. Flowers axillary or in axillary cymes or terminal panicles.

A Natural Order of more than 200 species, mostly Australian.

1. **SCÆVOLA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 539.

Calyx-tube turbinate ovoid or globose; limb usually short. Corolla-tube cleft at the back down to the base; lobes subequal, at length spreading like the fingers of a hand. Anthers free. Ovary 2–1-celled; ovules erect, solitary or in 1-celled ovaries 1–2. Indusium cup-shaped; stigma truncate or bifid. Fruit indehiscent, fleshy outside; endocarp hard. Seeds solitary; embryo terete, nearly as long as the albumen.—Flowers solitary between 2 bracteoles, sessile or pedunculate in the axils of the leaves or subtending bracts, or the peduncles dichotomously branched with a flower in each fork.

A genus of about 60 species, mostly Australian.

1. **S. Lobelia,** *Linn. Syst. Veg., edit.* xiii. (*Murray*) p. 178, *excl. syn. Rumph.* (1774). Shrubby, fleshy, glabrous in most parts; branchlets thick, marked below with the scar of fallen leaves, leafy above. Leaves obovate, crowded, rounded at the apex, narrowed to the sessile or broadly and shortly petiolate base, glabrous, $\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{2}{3}$–$1\frac{1}{2}$ in.; nerves inconspicuous. Axils of the leaves and bracts woolly or glabrescent. Inflorescence shorter than equalling or rather exceeding the leaves; bracteoles lanceolate, about equalling the ovary. Calyx-limb annular or shortly cup-shaped, truncate or obscurely toothed. Corolla glabrous outside, yellowish; tube nearly $\frac{1}{2}$ in. long, densely woolly inside; lobes oblong, about $\frac{1}{4}$ in. long. Indusium ciliate. Fruit about $\frac{1}{2}$ in. long.—*Lobelia Plumierii,* Linn. Sp. Pl. edit. i. p. 929 (1753); *S. Plumierii,* Vahl Symb. ii. p. 36 (1791); non herb. Linn.; *Cerbera ovata,* Sieber! in Hb. Seneg. n. 23 et ex Presl. Rel. Haenk. ii. p. 59 (1825), non Cav.; *S. senegalensis,* Presl, *l.c.*; *S. Thunbergii,* Eckl. et Zeyh. ex Presl in E. Mey. Comment. Pl. Afr. Austr. Dreg. p. 292 (1837); *S. Sieberi,* de Vriese, Goodenov. p. 33 (1854).

Upper Guinea. Senegambia, *Kohaut, Sieber!* Guinea, a maritime shrub, *Thonning!* Grand Bassa, *Th. Vogel!* St. Thomas Island, growing on the beach, *Mann!*

Lower Guinea. Elephants Bay, *Curror!* Ambriz, Loanda and Mossamedes, *Welwitsch!* Catombelam, *Wawra.*

Mozamb. Distr. Zambesi-land, Luabo River, *Kirk!*

Occurs also south of the tropic and in the Mascarene Islands, and has a wide distribution to India, the West Indies, the Galapago Islands. The extra-African synonymy is mostly omitted.

Order LXXV. **CAMPANULACEÆ.** (By W. B. Hemsley.)

Flowers hermaphrodite, or rarely by abortion unisexual, regular or irregular. Calyx-tube adnate to the ovary; limb usually 5-lobed or 5-partite, exceptionally 3–10-partite; lobes equal or slightly unequal, open valvate or imbricate in æstivation, usually persistent and enlarging after the corolla withers. Corolla gamopetalous, tubular campanulate rarely infundibuliform or rotate, straight or oblique, limb regular or oblique or bilabiate, lobes isomerous with the calyx, short or more or less deeply divided, valvate or induplicate-valvate, rarely 1, 2 or all the petals free. Stamens of the same number and alternate with the lobes of the corolla commonly inserted on the disk, sometimes on the tube of the corolla or adnate to it, filaments free from each other or cohering at the top or throughout their entire length; anthers linear oblong or rarely ovate-free or connate in a tube around the apex of the style, 2-celled, cells parallel, introrse, dehiscing longitudinally. Ovary inferior half inferior or rarely almost superior, 2–5- or rarely 6–10-celled, the septa sometimes imperfect or disappearing early; placentas axile or attached to the middle of the septa, stipitate or peltate; ovules numerous or rarely only two at the base or apex of each cell. Style simple, clavate at the apex, papillose, at first enclosed by the anthers afterwards protruding beyond them, stigmatic lobes of the same number as the cells of the ovary. Fruit capsular or baccate dehiscing variously or indehiscent. Seeds usually small; testa thin or coriaceous, smooth or reticulated; embryo straight in the axis of the albumen. —Herbs or undershrubs of various habit and foliage, usually with a milky juice.

An Order consisting of upwards of 50 genera and 1,000 species, dispersed over nearly all temperate and tropical regions.

Tribe 1. Lobelieæ. Corolla irregular. Anthers connate around the style. Peduncles axillary or centripetally racemose. . . . . 1. Lobelia.

Tribe 2. Cyphieæ. Corolla irregular. Anthers free. Inflorescence as in the Lobelieæ. . . . . 2. Cyphia.

Tribe 3. Campanuleæ. Corolla regular or only slightly oblique. Anthers free. Inflorescence various.

Capsule dehiscing loculicidally at the top into as many valves as there are cells. Flowers not spicate.

Corolla deeply divided into narrow lobes.

Slender annuals with minute flowers on long filiform peduncles. Lobes of the stigma short and broad . . . . . 3. Cephalostigma.

Herbs of various habit with sessile or shortly pedunculate flowers. Lobes of the stigma narrow . . . . . 4. Lightfootia.

Corolla with short broad lobes, rarely divided below the middle . . . . . 5. Wahlenbergia.

Capsule having a circumscissile dehiscence. Flowers in dense spikes . . . . . 6. Sphenoclea.

Capsule dehiscing laterally between the ribs into separate valves or pores . . . . . 7. Campanula.

1. LOBELIA, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 551.

Calyx-tube adnate to the ovary, turbinate hemispherical obovoid or rarely oblong-linear; limb 5-partite or 5-fid, lobes usually somewhat unequal. Corolla oblique or incurved, tube split to the base at the back only, or sometimes the two upper petals are almost free to the base or (in the section *Rhynchopetalum*) all the petals ultimately free, lobes erect and nearly equal or more frequently 2-lipped; upper lip 2-lobed, erect or spreading, lower 3-lobed. Staminal tube free from the corolla or rarely slightly adnate to it at the base, two or all of the anthers bearded at the tip, and often hairy on the back. Ovary inferior half inferior or almost free to the base, 2-celled; placentas many-seeded. Capsule turbinate oblong or cylindrical, inferior half inferior or nearly free, dehiscing loculicidally between the persistent calyx-lobes.—Herbs or undershrubs of very diverse aspect. Leaves alternate or opposite. Peduncles 1-flowered solitary in the axils of the leaves or bracts, either all axillary or arranged in terminal racemes. Bracts large and leafy or small or absent.—*Tupa*, of some authors, not of G. Don, Gen. Syst. iii. p. 700; *Rhynchopetalum*, Fresenius in Mus. Senckenb. iii. p. 66, t. 4; *Dobrowskia*, Presl, Prod. Mon. Lobel. p. 8; *Parastranthus*, G. Don, Gen. Syst. iii. p. 716.

A very large and polymorphous genus comprising about 200 species spread over nearly all temperate and tropical countries.

Tall erect stout herbs with simple stems naked in the lower part when in flower, terminating in dense spike-like bracteate racemes of almost sessile or only shortly pedicellate large flowers.
- Bracts and flowers more or less densely pubescent or villous.
  - Bracts considerably exceeding the flowers.
    - Bracts lanceolate as well as the flowers villous; calyx-lobes half as long as the corolla . . . 1. *L. Rhynchopetalum.*
    - Bracts linear, clothed as well as the flowers with a short pubescence; calyx-lobes less than half as long as the corolla . . . . . 2. *L. Gibberoa.*
  - Bracts not exceeding the flowers; calyx-lobes about a third of the length of the corolla . . . . . 3. *L. columnaris.*
- Bracts and flowers glabrous; calyx-lobes about a third of the length of the corolla . . . . . 4. *L. Deckenii.*

Slender erect procumbent or trailing herbs with axillary or loosely racemose small flowers on relatively long pedicels.
- Leaves alternate; the two lower anthers only bearded at the tip.
  - Stems trailing or procumbent often rooting at the nodes.
    - Petiole nearly as long as the blade.
      - Blade obtuse with shallow rounded teeth . . . 5. *L. trullifolia.*
      - Blade acute with very deep acute teeth . . . 6. *L. acutidens.*
    - Petiole much shorter than the blade.
      - Blade obtuse with deep rounded teeth . . . . 7. *L. Schimperi.*
  - Stems erect, less than two inches high . . . . . 8. *L. inconspicua.*
- Stems erect or procumbent usually more than six inches high, prominently winged.

Calyx-lobes subulate more than half as long as the corolla-tube . . . . . 9. *L. umbrosa.*
Calyx-lobes subulate, not half as long as the corolla-tube . . . . . 10. *L. Melleri.*
Calyx-lobes linear about one-third as long as the corolla . . . . . 11. *L. fervens.*
Calyx-lobes lanceolate, bristly at the back . . . 12. *L. chireensis.*
Stems erect usually more than six inches high, terete or obscurely angled.
Stem relatively stout and herbaceous.
Cauline leaves very small, acute, with one or two deep teeth on each side . . . . . 13. *L. exilis.*
Cauline leaves about an inch long, linear-oblong obtuse, callously toothed . . . . . 14. *L. senegalensis.*
Stem slender and woody.
Calyx-lobes equalling the corolla . . . . . 15. *L. meda.*
Calyx-lobes much shorter than the corolla-tube . 16. *L. natalensis.*
Calyx-lobes about a line long, scabrous . . . 17. *L. lavendulacea.*
Leaves mostly opposite; all the anthers bearded at the tip . . . . . 18. *L. stellarioides.*

1. **L. Rhynchopetalum,** *Hemsl.* A tall woody monocarpic (?) plant with the habit of a palm, having a stout hollow unbranched stem 12–15 ft. high, naked in the lower part when in flower, densely leafy towards the top, and terminating in a long simple dense spiciform bracteate raceme of greyish violet flowers. Leaves crowded, alternate, sessile, oblong-lanceolate, acute, entire, 1–2 ft. long, clothed with a grey woolly tomentum when young, ultimately quite glabrous, almost as broad at the base as in the middle, of a papery texture, traversed by a thick fleshy midrib, gradually passing into bracts. Flowers and bracts clothed with a dense soft felt-like tomentum; bracts leafy in the lower part of the inflorescence, smaller upwards, but always much longer than the flowers. Flowers 2–3 in. long, shortly pedicellate; calyx-lobes about half as long as the corolla, which finally splits into 5 free petals. Stamens equalling the style but much shorter than the corolla; filaments free at the base, connate above the middle; anthers connate around the stigma, the two lower ones bearded. Capsule oblong-spherical, prominently 10-ribbed, crowned by the long persistent calyx-lobes.—*Rhynchopetalum montanum*, Fresen. in Bot. Zeit. 1838, p. 603, Mus. Senckenb. iii. p. 66, t. 4; DC. Prodr. vii. p. 396. *Tupa Rhynchopetalum*, Hochst. Hb. Schimp. Abyss. n. 1263; Rich. Fl. Abyss. ii. p. 9.

Nile Land. Abyssinia, in Mt. Backit, 11,000–13,000 ft., *Schimper! Petit!*
The lower leaves of this species are unknown to us, and it is possible they differ very much from the upper ones. In Hb. Kew. is a sheet with flowers of this species, and a leaf exactly like those of *L. Giberroa;* possibly the specimens of the two species were accidentally mixed. The name 'montana' being already occupied in the genus, the second name has to be adopted.

2. **L. Giberroa,** *Hemsl.* Of the same habit as the last, but of smaller stature. Leaves crowded, sessile, oblong-obovate or lanceolate, 1½–2 ft. long, very much narrowed at the base, irregularly mucronately serrulate, membranous with a thick midrib and prominently veined, glabrous above, pubescent beneath. Flowers and bracts with a short

puberulous pubescence; bracts linear, very acute, not much overtopping the flowers, adnate to the base of the pedicels. Flowers shortly pedicellate, less crowded than in the preceding, 2–2½ in. long. Calyx-lobes not half as long as the corolla, the latter only split to the base on the upper side and the segments narrower. Stamens equalling the style and nearly as long as the corolla; filaments connate almost to the base; anthers connate around the stigma, the two lower ones bearded. Mature capsule not seen.—*Tupa Schimperi*, Hochst. in Rich. Fl. Abyss. ii. p. 10, t. 63.

Nile Land. Abyssinia, Mt. Aber, between the villages Addesselam and Maizacholo, 8000–8300 ft., *Schimper!*

Hochstetter's name having also been applied by him to a true Lobelia, we have substituted the native name, which really includes both this and *L. Rhynchopetalum.*

3. **L. columnaris,** *Hook. fil. in Journ. Linn. Soc.* vi. p. 14. A monocarpic (?) herbaceous plant with the habit of a *Digitalis.* Stems about 6 ft. high, unbranched, tomentose, clothed with alternate somewhat crowded sessile narrow lanceolate acute irregularly denticulate more or less pubescent leaves, 4 to 6 in. long, and terminating in a dense bracteate many-flowered raceme of yellow or blue flowers. Bracts pubescent, not exceeding the shortly pedicellate pubescent flowers. Calyx-lobes narrow, lanceolate, acute, entire, about a third of the length of the corolla, which is about 1½ in. long and divided into narrow lobes about half way down. Stamens equalling the corolla; filaments united to the base; anthers sparingly pilose, not bearded as in the foregoing. Style elongating after the flowers have expanded, and the stigma eventually projecting considerably beyond the staminal tube.

Upper Guinea. Fernando Po, Clarence Peak, *Mann!* Cameroons Mountains, *Mann!*

Perhaps the mainland specimen should be regarded as specifically different, but the material is insufficient to determine this question. In the typical specimen the leaves have a very prominently reticulated venation on the under surface, the bracts and pedicels are relatively longer, and the blue flowers are much more pubescent than those of the yellow-flowered specimen from the Cameroons.

4. **L. Deckenii,** *Hemsl.* Apparently a relatively miniature species of more slender growth and perfectly glabrous in all its parts. Bracts lanceolate-elliptical, acute, not much longer than the flowers, but almost concealing them. Flowers borne on short pedicels, less than 2 in. in length. Calyx-lobes about a third of the length of the corolla, which only splits on the upper side, and is otherwise not lobed. Stamens equalling the style and exceeding the corolla in length; filaments united almost to the base; the two lower anthers bearded.—*Tupa Deckenii*, Asch. in Bot. Zeit. 1869, p. 71. *T. Kerstenii*, Vatke in Linnæa xxxviii. p. 725.

Mozamb. Distr. Kilima-njaro, *Decken*, from an unpublished plate in Kew Herbarium, of a part of the inflorescence, which is all either of the writers quoted appear to have seen.

5. **L. trullifolia,** *Hemsl.* A weak trailing or procumbent much-branched plant, with slender angular herbaceous puberulous branches.

Leaves petiolate, ovate or ovate-rotundate, 6–9 lines long, obtuse, rounded or subcordate at the base, crenate-dentate, membranous, minutely puberulous when young, petiole nearly as long as the blade. Flowers less than 6 lines long, axillary, solitary, on filiform peduncles much longer than the leaves. Calyx-lobes linear-subulate, nearly as long as the corolla-tube, central lobe of the lower lip of the corolla obovate-rotundate, much constricted at the base, lateral ones oblong. Stamens as long as the corolla-tube; anthers hairy, the lower ones bearded at the tip.

Mozamb. Distr. Mount Chiradzura, Manganja range, *C. J. Meller!*

6. **L. acutidens,** *Hook. fil. in Journ. Linn. Soc.* vii. p. 204. A trailing plant with very long slender stems, almost woody at the base, perfectly glabrous in all its parts or sparingly furnished with minute transparent chaff-like hairs. Leaves alternate, petiolate, ovate-rotundate, about 6 lines long, acute, rounded at the base, deeply toothed, teeth very acute; petiole nearly as long as the blade. Flowers less than 6 lines long, axillary, solitary, on slender peduncles 1–1½ in. long. Calyx-lobes linear-subulate, about half as long as the corolla-tube. Lower lip of the corolla about 2 lines long, divided into three nearly equal oblong lobes, the lateral ones oblique. Stamens about as long as the corolla-tube; anthers hairy, the 2 lower ones bearded at the tip.

Upper Guinea. Fernando Po, 9000 ft., *Mann!*

7. **L. Schimperi,** *Hochst.*; *Rich. Fl. Abyss.* ii. p. 6. A trailing much-branched half-shrubby species, with very long and slender slightly angular glabrescent branches. Leaves alternate, shortly petiolate, obovate-oblong, obtuse, cuneate at the base, crenate-dentate with very obtuse teeth, more or less hispidly pilose when young, seeming almost or quite glabrous with age, from 3–6 lines long. Flowers exceeding 6 lines in length, axillary, solitary, on long slender peduncles 1–2 in. long. Calyx glabrous or hispidly pilose; lobes linear-subulate, acute, erect, nearly as long as the tubular portion of the corolla. Lobes of the upper lip of the corolla linear-lanceolate; lower lip divided into three nearly equal oblong lobes about 3 lines long, glabrous within. Stamens equalling the tube of the corolla; the two lower anthers slightly bearded, otherwise all glabrous.

Nile Land. Abyssinia, by rivulets in rocky places, Mt. Bachit, *Schimper!*

8. **L. inconspicua,** *Rich. Fl. Abyss.* ii. p. 8. An exceedingly dwarf annual, branched at the base, from 6–18 lines high. Leaves small, glabrous, oval or nearly rotundate, obtuse or acute, narrowed at the base into a short petiole. Flowers axillary, solitary, borne on peduncles often longer than the leaves. Calyx-lobes lanceolate; lobes of the upper lip of the corolla lanceolate acute, lower lip trifid. Filaments united only at the top; the two lower anthers bearded at the tip.—Description from Richard.

Nile Land. Abyssinia, *Quartin Dillon!*

This species, Richard observes, is very near *L. umbrosa*, differing in its thicker leaves, and less sparsely prominently winged stems, which are furnished with harsh hairs.

9. **L. umbrosa,** *Hochst.*; *Rich. Fl. Abyss.* ii. p. 7, excl. syns. A slender erect glabrous annual, with conspicuously winged stems. Leaves membranous, ovate-lanceolate, acute or obtuse, narrowed at the base, distantly and acutely toothed, 6–9 lines long, gradually passing into small bracts upwards. Flowers less than 3 lines long, solitary in the axils of the leaves and bracts, borne on extremely slender peduncles somewhat longer than the leaves. Calyx-lobes subulate, more than half as long as the corolla, which is fissured to the base on the upper side; two lower anthers bearded.

Nile Land. Abyssinia, *Schimper!*

Richard refers this to the *Lobelia Laurentia*, Linn., *Laurentia Michelii*, A.DC., but although the two plants bear a general resemblance to each other, there is no doubt that our plant is a true *Lobelia*, having the corolla split to the base.

10. **L. Melleri,** *Hemsl.* An erect glabrous much-branched annual, about a foot high, with prominently winged branches, terminating in long racemes of flowers. Leaves membranous, 1–2 in. long, lanceolate-oblong, obtuse, coarsely and irregularly crenate-dentate; blade narrowed about half way down into a winged petiole, the upper ones passing gradually into linear bracts, about half as long as the slender pedicels, which are from 6–9 lines long. Flowers less than 6 lines long; calyx-lobes linear-subulate, nearly as long as the corolla-tube. Upper anthers hairy on the back, lower two bearded at the tip. Capsule conical, about as long as the calyx-lobes.

Mozamb. Distr. Dakanamaio Islands, Zambesi Expedition, *C. J. Meller!*

This should perhaps be placed under *L. fervens*, but I have seen no authentic specimens of that plant, and the Mozambique *L. Petersiana*, which Sonder refers thither and which is the only one of Peters's plants I have seen, differs very much in the flowers.

11. **L. fervens,** *Thunb. Fl. Cap.* p. 183. An erect or ascending glabrous annual, a foot or more high, with more or less prominently winged compressed branches, terminating in long bracteate racemes of blue flowers. Leaves membranous, 1–2 in. long, serrulate, lower ones obovate or ovate-oblong, shortly petiolate, upper ones ovate-lanceolate or lanceolate attenuate at the base, sessile. Pedicels axillary, racemose, shorter or about as long as the linear bracts. Calyx-tube ovoid-obconical, equalling the linear lobes. Corolla three times as long as the calyx-lobes. Capsule obovoid acute at the base.—*L. Petersiana*, *humilis*, *pterocaulon*, *asperulata* and *subulata*, Klotzsch in Peters Mossamb. Bot. p. 299–302. Description chiefly from Sonder, Harv. and Sond. Fl. Cap. iii. p. 548.

Mozamb. Distr. Zanzibar and Cabaceira, *Peters! Hildebrandt!*

I have followed Sonder in writing the five species described by Klotzsch under one, though I have only seen *P. Petersiana*, and I have not seen an authentic specimen of *L. fervens.*

12. **L. chireensis,** *Rich. Fl. Abyss.* ii. p. 6. An erect, somewhat dichotomously branched, glabrous annual, less than a foot high, with 2- or 3-winged ciliate branches. Leaves lanceolate acute or obtuse, indistinctly callously serrate. Flowers axillary, solitary, on peduncles

shorter than the leaves. Calyx-tube globose, bristly glandular; lobes lanceolate, bristly on the back. Filaments free at the base; the two lower anthers bearded at the tip. Capsule globose, bristly, 5-ribbed. Description from Richard.

Nile Land. Chiré, *Quartin Dillon.*

13. **L. exilis,** *Hochst. in Rich. Fl. Abyss.* ii. p. 7. A dwarf glabrous slightly branched fleshy annual, with swollen fistular stems only a few inches high. Leaves very small, alternate, sessile, oblong-lanceolate, with one or two very sharp teeth on each side. Flowers small, terminating the slender branches. Calyx-lobes linear-lanceolate acute, hooked at the tip, coarsely ciliate on the margin, about one-third the length of the corolla-tube. Lobes of the upper lip of the corolla very acuminate and acute, central lobe of the lower lip elongate lanceolate, lateral lobes nearly triangular.—Description mainly from Richard, l. c.

Nile Land. Abyssinia, in wet meadows in the valley of the Tacazze, *Schimper!*

14. **L. senegalensis,** *A. DC. Prodr.* vii. p. 372. A glabrous erect annual, about a foot high, branching from the base. Stems rather stout, obscurely winged. Leaves alternate sessile linear-oblong obtuse entire or slightly toothed, somewhat fleshy with immersed venation, 1–1½ in. long. Flowers about 6 lines long, in terminal bracteate racemes; peduncles about as long as the bracts but lengthening considerably as the fruit matures. Calyx-lobes 1 line long, linear-subulate, subacute. Upper lip of the corolla of two linear lobes, lower lip broadly 3-lobed. Filaments united to the base; the 3 upper anthers prominently hairy, 2 lower bearded at the tip.—Del. Ic. Sel. v. t. 10. *L. triquetra,* Sieb., not of Linnæus.

Upper Guinea. Senegal, *Sieber!*

In Kew Herbarium there is a *Lobelia* without flowers collected by Barter, Niger Exped. No. 797, which should probably be referred hither. It differs only, so far as the material goes, in having acute leaves with distant more conspicuous callous or mucronate teeth.

15. **L. nuda,** *Hemsl.* An erect branching annual about a foot high, the radical leaves and base of the stems sparingly hirsute; branches terete, with a few linear obtuse entire leaves from 1–2 in. long. Radical leaves oblong or obovate-spathulate, crenate, narrowed into a petiole, exceeding an inch in length. Flowers less than 6 lines long in loose terminal minutely bracteate racemes, on slender pedicels 6–9 lines long. Calyx glabrous; lobes nearly half as long as the corolla and equalling the tube. Anthers slightly hairy on the back, the two lower ones only bearded at the tip. Capsula oblong-cylindrical.

Mozamb. Distr. Highlands of Batoka country, *Kirk!*

This belongs to the *Erinus* section and will probably turn out to be identical with some South African species. It does not agree with any of the species described by Klotzsch.

16. **L. natalensis,** *A. DC. Prod.* vii. p. 369. A rambling branched glabrous or slightly hairy annual (?) species with terete or slightly angular branches rising to a height of a foot or more and terminating

in racemes of flowers. Radical leaves petiolate rotundate entire, about 3 or 4 lines in diameter, passing gradually into sessile linear-oblong distantly and callously serrate cauline ones an inch or more long, and in the upper part into bracts. Flowers 6–8 lines long, on slender pedicels about an inch long. Calyx glabrous, the linear-lanceolate lobes less than a third as long as the corolla-tube. Upper anthers glabrous at the back, lower two bearded at the tip.

South Central. Island at Victoria Falls, *Dr. Kirk!*

The above description applies only to the Tropical African plant, which appears to differ only from the Natal specimens in the upper anthers being glabrous on the back.

17. **L. lavendulacea,** *Kl. in Peters Mossamb. Bot.* p. 302. An erect densely branched annual 1–1½ ft. high, with slender twiggy slightly scabrous angular branches. Leaves glaucous linear obtuse narrowed at the base, with a few distant sinuous teeth, the lower ones 2 in. long by 2 lines broad, the upper ones bract-like and much smaller. Flowers numerous at the ends of the branches and solitary in the axils of the leaves or bracts, on slender compressed peduncles about half an inch long. Calyx slightly scabrous, lobes lanceolate-subulate, 1 line long. Corolla blue, less than half an inch long, the upper lobes linear acute hairy on the inside, the lower lobes ovate acute glabrous. Upper anthers glabrescent, lower ones bearded at the tip. Capsule glabrous, 10-ribbed.—The description chiefly from Klotzsch.

Mozamb. Distr. Zanzibar, *Peters!*

Sonder (*Flora capensis*, iii. p. 546) refers this to his var. γ. *secundata* of *L. triquetra*, Linn., to which species it may belong, but it has a very different aspect, and the material is insufficient to determine the question.

18. **L. stellarioides,** *Benth. et Hook. Gen. Pl.* ii. pars ii. p. 353. A much-branched annual or perennial. Stems weak slender angular, more or less clothed with recurved prickly bristles, 1–2 ft. high. Leaves opposite, or the upper ones alternate, sessile or narrowed into a short petiole, linear-lanceolate oblong or ovate oblong, 1–1½ in. long, obtuse or acute, mucronate, more or less scabrous especially on the margin and midrib, distantly dentate-serrulate or almost crenate-serrulate and constricted where the teeth occur; teeth mucronate or terminating in a hard white incurved callus. Flowers axillary, solitary, borne on slender scabrous peduncles longer than the leaves and growing out after the flowers have withered. Calyx-lobes scabrous linear-oblong mucronulate spreading about half as long as the corolla, but growing out considerably as the fruit matures. Corolla about half an inch long, yellow in the Abyssinian specimens (Schimper). All the anthers bearded at the tip. Capsule oblong, nearly smooth, about 3 lines long.—*Dobrowskia stellarioides*, Presl, Prodr. Lob. p. 10; DC. Prodr. vii. p. 356; *Parastranthus stellarioides*, Vatke, in Linnæa xxxviii. p. 717.

Nile Land. Ankobar, Abyssinia, Monastery of Thecla Haimanot, *Dr. Roth!* Tigré, *Schimper!*

This species also occurs at Natal, where it has blue flowers.

2. CYPHIA, Berg.; Benth. et Hook. f. Gen. Pl. ii. p. 554.

Calyx-tube adnate to the ovary; limb 5-partite. Corolla-tube oblique, or petals scarcely cohering at all, bilabiate or almost regular. Stamens free from the corolla or slightly adnate to its base; filaments free or monadelphous at the base; anthers free, dehiscing introrsely. Ovary inferior or partly superior, 2-celled; ovules numerous. Stigma oblique, clavate or broadly 2-lobed, viscous or papillose before the flowers expand. Capsule dehiscing loculicidally and septicidally at the tip between the persistent calyx-lobes into 4 valves. Seeds ovoid or angular.—Perennial slender erect or climbing herbs, with alternate entire or divided leaves and axillary racemose or spicate blue white or red flowers.

A genus of about 20 known species, with the exception of the one described below, natives of South Africa.

1. **C. glandulifera,** *Hochst. in Rich. Fl. Abyss.* ii. p. 8, t. 64. Stem annual simple, springing from an ovoid or oblong tuber about an inch in its greatest diameter, erect, 6–12 inches high, glabrous, naked in the lower part with a few leaves in the middle and terminating in a slender few-flowered raceme. Leaves alternate, sessile, lanceolate, 1½–4 in. long, acute, bordered with distant fleshy teeth, glabrous, membranous. Raceme 2–4 in. long; pedicels 1–2 lines long; lower bracts equalling the flowers, upper ones scarcely exceeding the pedicels. Flowers glabrous, about 6 lines in diameter. Calyx-lobes linear-lanceolate. Petals narrowly spathulate-lanceolate, narrower in the middle. Filaments free; anthers all bearded at the tip. Capsule globose, 5-ribbed.

Nile Land. Abyssinia, in mountains near Geladjeranne, *Schimper!* near Keren, *Hildebrandt!*

According to Richard the tubers of this plant are eaten by the poorer people, and he adds that they have nothing unpleasant in their flavour.

3. CEPHALOSTIGMA, A. DC.; Benth. et Hook. f. Gen. Pl. ii. p. 555.

Calyx-tube adnate to the ovary; limb 5-partite. Corolla of 5 almost or quite free petals. Stamens free from the corolla; filaments dilated at the base; anthers free. Ovary inferior, 2 or 3-celled; ovules numerous; style slightly conical at the base; stigma shortly bifid or trifid. Capsule dehiscing loculicidally at the top between the calyx-lobes.—Slender small annual erect branching pilose herbs with alternate sessile leaves and very minute flowers.

About 8 species are known in Tropical Africa and India, one of them extending to Brazil.

Hispidly pilose.
  Usually exceeding six inches high.
    Calyx-lobes 2–3 lines long; petals linear-lanceolate . 1. *C. hirsutum.*
    Calyx-lobes 1–2 lines long; petals ovate-lanceolate . 2. *C. Perrottetii.*
  Usually less than six inches high.

Calyx-lobes about half a line long; petals linear, 1 line long.	3. *C. ramosissimum.*
Glabrous; calyx-lobes about half a line long; petals linear, 1 line long	4. *C. Prieurei.*

1. **C. hirsutum,** *Edgw. in Linn. Trans.* xx. p. 81. An erect much-branched hispidly pilose annual, from a few inches to a foot or more high. Branches slender, terete or slightly angular. Leaves alternate, sessile, linear-lanceolate to broadly oval or elliptical, rarely exceeding an inch in length, entire or undulate-dentate and having a white cartilaginous margin, densely pilose when young, but becoming nearly glabrous with age, gradually smaller upwards and passing into minute bracts. Flowers in racemose panicles, very numerous, larger than in either of the other species, solitary, on slender pedicels in the axils of the upper leaves and bracts. Calyx 2–3 lines long, tube densely hispidly pilose; lobes about equalling the tube, glabrous, erect, lanceolate, acute, with a prominently thickened margin. Petals linear-lanceolate, 2–3 lines long. Capsule hemispherical, hispid.—*C. Schimperi*, Hochst. in Rich. Fl. Abyss. ii. p. 2; *C. erectum*, Vatke, Linnæa xxxviii. p. 699; *Wahlenbergia Schimperi*, Hochst. in Hb. Schimp. Abyss. 1964; *W. perotifolia*, Wight et Arn. in Wight Ic. 842.

Nile Land. Abyssinia, *Schimper!*

Mozamb. Distr. Zambesi Exped. About 16° S. lat, and 35° E. long., *Meller!*

This species extends to the Indian Peninsula and Western Himalaya.

2. **C. Perrottetii,** *A. DC. Prodr.* vii. p. 420. An erect simple or slightly-branched annual, 1–2 ft. or more in height, sparingly hispidly pilose, especially on the lower part of the stem and lower leaves. Branches terete or obsoletely angled. Leaves alternate, sessile, pilose when young, lanceolate, acute, 6–12 lines or more long, undulate and obscurely toothed on the margin. Flowers numerous, small, in loose racemes or sub-cymose panicles a foot or more in length; bracts small, linear, much shorter than the slender pedicels, which vary from 3 to 12 lines in length. Calyx-tube glabrous, about $1\frac{1}{2}$ lines long; lobes about equal in length. Petals ovate-lanceolate, much broader at the base than in the middle, exceeding 2 lines in length. Capsule turbinate, 5-ribbed.—? Del. Ic. Sel. v. t. 15; *C. bahiense*, A. DC. l.c.

Upper Guinea. Cape Verd, *Perrottet & Leprieur!* Senegambia, *Heudelot!* Gaboon River, *Mann!* Also in South America.

The plate in Delessert represents the petals as linear-lanceolate, but otherwise agrees with the type. In Kew herbarium there is a specimen collected by Barter on the Niger (826) which seems to connect this with *C. hirsutum* in its more hispidly pilose calyx with longer lobes.

3. **C. ramosissimum,** *Hemsl.* An erect hispidly pilose much-branched annual of compact growth, from 3–6 in. high. Branches alternate, very slender, deeply furrowed with sharp ridges. Leaves alternate, sessile, oblong or ovate-lanceolate, 3–5 lines long, acute, broad at the base, coriaceous, cartilaginous on the margin, with 2 or 3 almost obsolete teeth on each side, smaller upwards and in the last ramifications

reduced to minute bracts; midrib prominent. Flowers minute, very numerous, on filiform pedicels 4–8 lines long. Calyx less than one line long, lobes equalling the tube, triangular, with a raised margin and midrib. Petals about a line long, linear or slightly oblanceolate. Capsule glabrous, hemispherical or obconical, crowned with the persistent calyx-lobes, obscurely 5-ribbed.—*C. Perrottetii*, Hook. fil. in Journ. Linn. Soc. vii. p. 204, not of A. DC.

Upper Guinea. Cameroons Mountains, 7,000 ft., *Mann!*

This differs so much, not only in size, from the authentic specimens of *C. Perrottetii* that it has been considered necessary to give it specific rank here, though it is possible that more complete material may lead to all the African forms being united under one species extending both to Asia and America.

4. **C. Prieurei,** *A. DC. Prodr.* vii. p. 420. A dwarf glabrous herb, 3–4 in. high; stem hard and woody and naked at the base, branching upwards; branches very slender, many-flowered. Radical leaves not seen; cauline alternate, sessile at the base of the branches, linear, 2–3 lines long, entire, with a white undulate margin, glabrous; upper ones very small, subulate. Flowers minute, very numerous, paniculate; peduncles often dichotomous; pedicels filiform, 4 lines long. Calyx-lobes subulate, half a line long. Petals linear, scarcely twice as long as the calyx-lobes. Capsule obconical, 5-ribbed, about a line long. —Description from De Candolle.

Upper Guinea. Senegal, *Leprieur & Perrottet.*

The description agrees in many particulars with *C. ramosissimum*, but the glabrous branches and leaves and subulate calyx-lobes are points of difference.

4. LIGHTFOOTIA, Lher.; Benth. et Hook. f. Gen. Pl. ii. p. 555.

Calyx-tube adnate to the ovary, hemispherical turbinate more rarely obconical; lobes persistent. Corolla deeply 5-lobed or almost parted to the base. Stamens free from the corolla, filaments dilated at the base, anthers free. Ovary inferior half inferior or nearly superior, 2–5-celled; placentas stipitate, usually with few ovules; stigma 2–5-lobed. Capsule dehiscing loculicidally at the top into as many valves as there are cells.—Undershrubs or annual biennial or perennial herbs, with alternate, rarely opposite or fasciculate, usually small narow rigid entire or toothed leaves and very small blue white or pink variously arranged flowers.

An African genus of about 40 species, chiefly extratropical, one extending to Madagascar.

Ovary and capsule inferior or half inferior.
- Undershrubs; ovary 3-celled.
  - Leaves lanceolate or oblong.
    - Flowers subspicate; calyx pilose . . . . . 1. *L. marginata.*
    - Flowers cymose paniculate; calyx glabrous . . . 2. *L. abyssinica.*
  - Leaves linear-subulate crowded . . . . . 3. *L. tenuifolia.*
- Biennials with fusiform roots and a capitulate inflorescence; ovary 3-celled.
  - Stem 1–1½ ft. high; lower cauline leaves 4–8 lines long, narrowed into a petiole . . . . . 4. *L. collomioides.*

Stem 1½–4 ft. high; lower cauline leaves 2–3 in. long, scarcely narrowed into a petiole	5. *L. napiformis.*
Annuals of slender habit, with a diffuse inflorescence and pedicellate flowers.	
Calyx-lobes less than ½ line long; corolla-lobes deep blue rather longer, slightly hairy	6. *L. annua.*
Calyx-lobes about a line long; corolla-lobes yellowish-violet about as long	7. *L. arenaria.*
Calyx-lobes less than ½ line long; corolla-lobes deep blue 3 or 4 times as long, glabrous	8. *L. gracilis.*
Calyx-lobes as in the last, but bristly at the tips; corolla-lobes cohering after flowering as in *Wahlenbergia*, yellow and blue	9. *L. exilis.*
Calyx-lobes hairy, about ½ line long; lobes of the corolla milky-blue, about twice as long	10. *L. debilis.*
Calyx-lobes glabrous, less than ½ line long; lobes of corolla 3 or 4 times as long	11. *L. paniculata.*
Ovary and capsule almost wholly superior, 2-celled . . .	12. *L. Welwitschii.*

1. **L. marginata,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 326. Suffrutescent with woody ascending pilose stems 8–18 in. high, naked at the base. Leaves alternate sessile oblong or lanceolate acute, 2–12 lines long, passing gradually into bracts, glabrous or sparsely pilose, with a few callous teeth; margin of the leaves bracts and calyx-lobes white with distant callosities. Inflorescence loosely subspicate; flowers 1–3 in the axils of the bracts, which equal the flowers, on pedicels 1–2 lines long. Calyx-tube obconical pilose; lobes lanceolate entire. Corolla divided almost to the base, pale blue 1¼–1¾ lines long. Capsule obconical, free in the upper part.—Description chiefly from De Candolle.*

Lower Guinea. Huilla, in woody and rocky places, *Welwitsch!*

2. **L. abyssinica,** *Hochst. in Rich. Fl. Abyss.* ii. p. 1. An erect branching half shrubby perennial, 1½–2 ft. high, young parts glabrous puberulous or almost hispidly pilose, according to the nature of the habitat in which the plant grows. Branches slender hard and woody. Leaves alternate sessile lanceolate or linear-lanceolate acute cartilaginous on the margin entire or with a few distant callous teeth, somewhat hard and coriaceous, 1½–3 in. long; midrib prominent, secondary nerves inconspicuous. Flowers small in narrow cymose branched panicles a foot or more in length; bracts minute; pedicels 3–6 lines long, elongating in fruit. Calyx glabrous; lobes equalling the hemispherical tube. Petals about 3 lines long, narrow, finally twisted. Capsule subglobose, prominently 5-ribbed.

Nile Land. Abyssinia, *Schimper!*
Mozamb. Distr. Manganja Hills, *Meller!* Moramballa, *Kirk!*
The Abyssinian specimens are much more hirsute than the southern ones, but there appears to be no other difference, and this is only one of degree.

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* After drawing up the descriptions from De Candolle, l.c. I had an opportunity of seeing a set of Welwitsch's specimens at the British Museum, and found it necessary to make some considerable alterations in the dimensions, etc.

3. **L. tenuifolia,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 327. Suffrutescent with several ascending pubescent cylindrical somewhat woody, not fleshy, stems 12–18 in. high, more or less branching upwards. Leaves alternate much crowded narrow-linear, 4–12 lines long, dentate, pilose beneath. Flowers often solitary in the axils of the upper leaves. Pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lines long as well as the hemispherical calyx-tube pubescent. Calyx-lobes scarcely exceeding a line in length erect slender furnished with a few teeth. Lobes of the corolla linear somewhat pilose slightly exceeding the calyx-lobes very pale blue.—Description chiefly from De Candolle.

Lower Guinea. Huilla, in dense woods, *Welwitsch!*

4. **L. collomioides,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 328. A biennial with a fusiform root and 1 or 2 purplish erect slightly branched puberulous stems from 12–18 in. high. Leaves alternate (radical not seen) lower ones obovate-oblong obtuse (4–8 lines long), narrowed into a short petiole, the rest sessile acute 8–16 lines long, puberulous on both sides, margin thickened, crenate, crenatures denticulate. Flowers pale blue in small terminal subglobose bracteate heads; bracts linear crenate or entire pilose. Calyx-tube hemispherical glabrous or pilose at the top; lobes lanceolate pilose on the margin and back, scarcely a line long. Corolla 5-partite, $1\frac{1}{2}$ lines long; lobes linear.—Description after De Candolle.

Lower Guinea. Huilla, in elevated humid pastures, *Welwitsch!*

5. **L. napiformis,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 328. A biennial with a turnip-shaped or fusiform root from which rises a simple or slightly branched terete pubescent stem $1\frac{1}{2}$–4 ft. high. Leaves alternate, margin thickened crenate crenatures denticulate or dentate puberulous on both sides, lower ones oblong or narrowly obovate-oblong, about 2–3 in. long, scarcely narrowed into a petiole, subacute, upper ones lanceolate, gradually shorter, narrower and more acute. Flowers pale violet, in small axillary and terminal heads intermixed with small linear bracts similar to the upper leaves. Otherwise like *L. collomioides.*—Description after De Candolle.

Lower Guinea. Pungo Andongo, in dry bushy places, *Welwitsch!*

6. **L. annua,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 329. A diffuse hairy annual 6–18 in. high with the habit of *Stachys annua.* Leaves alternate, sessile, lanceolate-oblong or obovate-oblong, 8–10 lines long, obtuse or subacute, membranous, hairy on both sides along the midrib, margin white with a few distant callous teeth, lateral veins indistinct, gradually passing into shorter lanceolate acuminate bracts. Flowers deep blue, usually in 3-flowered axillary and terminal racemes. Pedicels very short, furnished as well as the hemispherical calyx-tube with hispid hairs. Calyx-lobes less than a line long, entire, sparingly pilose. Corolla-lobes linear, rather longer than the calyx-lobes, with here and there a few hairs on the back. Capsule half-superior.—Description after De Candolle.

Lower Guinea. Huilla, in dry stony and bushy pastures, *Welwitsch!*

7. **L. arenaria,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 329. An annual with angular hairy stems 6–15 in. high. Leaves alternate sessile oblong or lanceolate acute thickened at the margin and hairy along the midrib or the under surface, lower ones 6–7 lines long, the middle and upper ones gradually narrower and shorter; all sparsely hispidly pilose. Inflorescence diffuse many-flowered; pedicels slender longer than the bracts. Calyx-tube in the flower about a line long, in the fruit nearly 2 lines long; lobes erect, nearly as long. Lobes of the corolla slender, linear, yellowish violet. Capsule half superior, usually 3-celled, occasionally 4-celled.

Lower Guinea. Huilla, in sandy places, *Welwitsch!*

8. **L. gracilis,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 330. A dwarf slender erect annual furnished with a few scattered hispid hairs. Leaves alternate distant narrow-linear, margin thicker, obsoletely toothed, $1\frac{1}{4}$–$2\frac{1}{2}$ lines long. Flowers deep blue on slender pedicels $2\frac{1}{2}$–5 lines long. Calyx-lobes less than half a line long lanceolate hairy at the tip. Lobes of the corolla glabrous, 3 or 4 times as long as the calyx-lobes. Capsule less than a line long, turbinate, 3-celled.—Description after De Candolle.

Lower Guinea. Huilla, *Welwitsch!*

9. **L. exilis,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 330. Resembling *L. gracilis*, but having broader distinctly toothed leaves, shorter bracts and the calyx-lobes bristly at the tip. Lobes of the corolla not irregularly spreading after flowering as in *Lightfootia*, but cohering as in *Wahlenbergia*. Corolla yellow and blue.—Description after De Candolle.

Lower Guinea. Huilla, *Welwitsch!*

10. **L. debilis,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 331. An annual with diffuse slender weak slightly pubescent stems 8–10 in. high. Leaves alternate, lower ones elliptical, 3–$4\frac{1}{2}$ lines long, obtuse, middle ones linear-oblong and upper ones linear and less than $\frac{1}{2}$ a line long; all of them distantly denticulate and sparsely pilose. Flowers milk-blue on pedicels about 4 lines long. Calyx-lobes lanceolate hairy at the tips, about $\frac{1}{2}$ a line long; lobes of the corolla twice as long.—Description after De Candolle.

Lower Guinea. Huilla, in moist pastures, *Welwitsch!*

11. **L. paniculata,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 331. A glabrescent annual 8–12 in. high, with 3 or 4 slender ascending stems, branching at the base. Leaves alternate, sessile, oblong-lanceolate or linear, margin thicker with a few distant obscure teeth, lower ones crowded, 6–8 lines long, gradually smaller and more distant upwards into linear bracts, not more than a line long. Pedicels slender, 1–2 lines long. Calyx glabrous; tube obovoid; lobes erect lanceolate, less than $\frac{1}{2}$ a line long, obscurely bristly at the tip. Corolla-lobes gla-

brous 1½–1¾ lines long. Capsule almost wholly inferior, hemispherical. —Description after De Candolle.

Lower Guinea. Huilla, in marshy places which are inundated in the summer, *Welwitsch !*

12. **L. Welwitschii,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 332. An annual with slender ascending stems 4–8 in., as well as the leaves glabrous or with a few scattered hairs. Leaves alternate, distant, sessile, linear or linear-lanceolate, acuminate, margin cartilaginous and remotely toothed, from 2–4 lines long. Peduncles and pedicels very slender. Flowers terminating the branches and proceeding from the axils of the upper ones on pedicels ½ to 2 lines long, of a livid yellow colour. Calyx about 2 lines long; tube very short and broad; lobes entire sparsely ciliate, furnished with one or two hairs at the tip, margin fleshy, entire. Corolla 5-partite, lobes not exceeding the calyx. Ovary and capsule almost wholly superior.—Description after De Candolle.

Lower Guinea. Pungo Andongo, in humid sylvan meadows, *Welwitsch !*

A very singular plant, at first sight very different from any Campanulaceæ, especially in the practically free ovary.

5. WAHLENBERGIA, Schrad.; Benth. et Hook. f. Gen. Pl. ii. p. 555.

Calyx-tube adnate to the ovary; limb 5-parted or very rarely with only 3 or 4 lobes. Corolla campanulate funnel-shaped tubular or almost rotate, slightly 5-lobed, or parted to the middle or sometimes deeper, very rarely with only 3 or 4 lobes. Stamens free from the corolla; filaments usually dilated at the base; anthers free. Ovary inferior or half-superior, 2–5-celled; ovules numerous; stigma narrowly 2–5-fid. Capsule dehiscing loculicidally into as many valves as there are cells, when there are 5 valves alternating with the calyx-lobes.—Annual or perennial herbs of various habit, often woody at the base. Leaves alternate or rarely opposite. Flowers usually some shade of blue, variously arranged, nodding; capsule erect.

A genus of nearly 80 species, chiefly South African, a few occurring in Tropical America and the Mediterranean region and one widely spread in Western Europe.

Perennials with ascending slender leafy stems, terminating in long naked few-flowered peduncles.
- Capsule about 2 lines in length, half-superior, 3-celled — 1. *W. arguta.*
- Capsule 5–7 lines long, wholly inferior, 2-celled.
  - Nearly glabrous; calyx-lobes linear-lanceolate . . — 2. *W. silenoides.*
  - Conspicuously hispidly pilose; calyx-lobes ovate-lanceolate . . . . . — 3. *W. Mannii.*

Perennial with short naked stems bearing rosettes of leaves and almost sessile terminal flowers . . . . — 4. *W. pusilla.*

Annuals rarely exceeding 6 in. high.
- Perfect stamens 3 or 4.
  - Leaves oblong or obovate-oblong . . . . . — 5. *W. huillana.*
  - Leaves linear-lanceolate . . . . . — 6. *W. Cervicina.*
- Perfect stamens 5.
  - Leaves linear-lanceolate or subulate . . . . . — 7. *W. humilis.*

Annuals usually a foot or more high; perfect stamens 5.	
Calyx-lobes lanceolate obtuse, erect, equalling the tube	8. *W. inhambanensis.*
Calyx-lobes thick, half as long as the tube	9. *W. riparia.*
Calyx-lobes slender, lanceolate acute, nearly as long as the tube	10. *W. etbaica.*

1. **W. arguta,** *Hook. fil. in Journ. Linn. Soc.* vi. p. 15. A pilose or almost glabrous herb with slender leafy ascending stems about a foot high, dichotomously branched into long naked peduncles. Leaves sessile oblong-lanceolate acute or obovate, of a harsh texture in dried specimens, deeply serrated, puberulous pilose or quite glabrous, 3–9 lines long. Peduncles 6 in. or more long with usually about 3 pedicellate flowers at the top. Calyx glabrous about 3 lines long, the lanceolate acute lobes twice as long as the turbinate 10-nerved tube. Corolla pale blue narrow-campanulate, 4–5 lines long; lobes about a third of the whole length. Capsule more than half-superior 3-celled, turbinate at both ends scarcely exceeding 2 lines in length.

Upper Guinea. Clarence Peak, 8500 ft., Fernando Po, *Mann!* Cameroons Mountains, 7000 to 10,000 ft., *Mann!*

2. **W. silenoides,** *Hochst. in Rich. Fl. Abyss.* ii. p. 3. Of the same habit and floral characters as *W. Mannii*, but the young leaves and stems are almost entirely glabrous, and the calyx-lobes are linear-lanceolate. The short woody stem or root-stock bears a tuft of slender virgate branches, clothed with small lanceolate-elliptical almost glabrous leaves, which are more distant in the upper part, giving the peduncles a less naked appearance than those of *W. Mannii*.

Nile Land. Abyssinia, *Schimper! Roth!*

Schimper's number 998 is the typical plant, and is perhaps sufficiently distinct, but his 928 has larger leaves and is otherwise more like the preceding, except in the calyx-lobes and the less hairiness of the stem and leaves.

3. **W. Mannii,** *Vatke in Linnæa*, xxxviii. p. 700. A tufted herb, with numerous slender ascending branches rising from a relatively stout woody root-stock; branches 6–18 in. high, leafy in the lower part and clothed with a loose tomentum of long white hispid hairs, glabrous upwards and terminating in a long naked simple or slightly branched peduncle. Leaves crowded sessile ovate-lanceolate acute more or less hispidly pilose when young especially along the midrib on the lower surface, margin white cartilaginous undulate furnished with a few minute callosities. Calyx glabrous, about 4 lines long, the cylindrical tube nearly twice as long as the ovate-lanceolate subobtuse lobes. Corolla very small, scarcely 2 lines long. Capsule wholly inferior, 2-celled, cylindrical, narrowed at the base, 4–7 lines long.—*W. polyclada*, Hook. fil. in Journ. Linn. Soc. vi. p. 15, not of A. DC.

Upper Guinea. Clarence Peak, Fernando Po, 9000 ft., and Cameroons Mountains, 7000 to 8000 ft., *Mann!*

This and the next are probably races of one species, but in the absence of more complete material it is convenient to keep them separate.

4. **W. pusilla,** *Hochst. in Rich. Fl. Abyss.* ii. p. 2. A cæspitose dwarf herb, only a few inches high ; branches procumbent, naked at the base, with rosettes of small leaves at the ends, from the centre of which spring the almost sessile flowers. Leaves oblong-spathulate obtuse or acute entire or more or less conspicuously dentate-crenate, 3–6 lines long, sparsely pilose and ciliate when young. Flowers very small, scarcely 2 lines long, apparently solitary at the ends of the branches and almost concealed by the leaves. Calyx-tube obconical, naked, lobes lanceolate acute entire glabrous. Corolla oblong-campanulate about twice as long as the calyx-lobes. Capsule globose glabrous 3-celled.—Description of the flower and capsule from Richard.

Nile Land. Abyssinia (Mount Bachit), *Schimper !*

5. **W. huillana,** *A. DC. in Ann. Sc. Nat.* sér. 5, vi. p. 333. An annual with several slender ascending branching stems from 3–6 in. Leaves alternate sessile oblong or obovate-oblong entire or obscurely and distantly toothed, often obtuse, sparsely hairy or glabrous, 2–4 lines long. Flowers bluish white, for the greater part trimerous or tetramerous, opposite the leaves, on erect pedicels primarily less than half a line long, but which lengthen out to nearly 2 lines as the capsule approaches maturity. Calyx about 2 lines long; tube glabrous acute at the base almost ribless; lobes 4 oblong one much smaller than the others or altogether wanting, the lateral ones furnished with 1 or 2 teeth. Corolla usually shorter, 4- or 3-fid ; tube cylindrical ; lobes ovate. Stamens 3 (? always).—Description after De Candolle.

Lower Guinea. Huilla, in marshy woods, *Welwitsch !*
Var. β. *pusilla*, A. DC. l. c., much smaller (about 2 lines tall, "4–5 *mill. alta*"). Stem sometimes simple and exceedingly slender, otherwise in foliage and flowers as in the species.

Lower Guinea. Huilla, in elevated pastures of Espalanca, *Welwitsch !*

6. **W. Cervicina,** *A. DC. Prodr.* vii. p. 440. A dwarf branching pilose annual, 2 or 3 in. high. Leaves alternate sessile linear-lanceolate, less than ½ in. long obscurely denticulate. Flowers very small, borne on short peduncles opposite the leaves. Calyx-tube pilose ovoid ; lobes 3 or 4 linear-lanceolate obscurely toothed. Corolla 3- or 4-lobed slightly exceeding the calyx-lobes. Stamens 3. Capsule 2-celled.—*Cervicina campanuloides*, Delile Fl. d'Egypt. p. 7, t. 5, fig. 2. *Wahlenbergia campanuloides*, Vatke, in Linnæa xxxviii. p. 700.—Description after De Candolle.

Upper Guinea. Senegal, *Leprieur and Perrottet.*
It also occurs in Egypt.

7. **W. humilis,** *A. DC. Prodr.* vii. p. 434. A dwarf annual, 3–6 in. high, with a simple erect unbranched or slightly branched stem, pilose at the base, glabrous upwards. Leaves crowded chiefly at the base of the stem, lower ones linear-lanceolate, pilose, obscurely denticulate, margin undulate white, upper ones subulate. Peduncles dichotomous. Calyx glabrous tube narrow ovoid, lobes linear erect some-

what longer. Corolla-lobes half as long again as the calyx. Capsule obovoid.—Description after De Candolle.

Upper Guinea. Senegambia, *Leprieur and Perrottet.*
Perhaps only a dwarf state of *W. riparia.*

8. **W. inhambanensis,** *Kl. in Peters Mossamb. Bot.* p. 303. An erect slender branching glabrous annual. Branches very slender and finely grooved, spreading. Leaves membranous, oblong, somewhat obtuse, sinuate-dentate, much attenuated at the base, 1–2 in. long by 1½–4 lines broad. Inflorescence once or twice dichotomously branched; flowers on filiform pedicels 1½ in. long, subtended by subulate bracts 1½ lines long. Calyx campanulate, 5-ribbed; lobes lanceolate, obtuse, erect, equalling the tube; corolla funnel-shaped, 4 lines long and 5 lines in diameter, deeply 5-partite. Capsule turbinate, 5-ribbed, many-seeded.—Description chiefly from Klotzsch.

Mozamb. Distr. Inhambane, *Peters!*

9. **W. riparia,** *A. DC. Prodr.* vii. p. 435. An erect, unbranched or slightly branched, hispidly pilose annual, 1–2 ft. high, glabrous or glabrescent in the upper part. Leaves sessile from obovate-lanceolate and obtuse to linear-lanceolate acute, 1–2½ in. long, lower ones especially hispidly pilose, margin white, cartilaginous, conspicuously undulate-dentate or almost entire. Peduncles dichotomous, long and slender, furnished with small bracts. Calyx glabrous, tube twice as long as the erect thick lobes. Corolla about 2 lines long and twice the length of the calyx-lobes. Capsule wholly inferior, 3-celled, obovoid, including the calyx-lobes 4–5 lines long.

Upper Guinea. Senegal, *Leprieur and Perrottet!* Nupe, *Barter!*

10. **W. etbaica,** *Vatke in Linnæa,* xxxviii. p. 700. An annual with an almost unbranched stem, leafy and hispid in the lower half, leafless and glabrous above, about 10 in. high. Leaves alternate, sessile, ovate-lanceolate, narrowed at the base, about 2 in. long by 9 lines broad, the upper ones acute, hispid along the midrib on the under surface, margin irregularly undulate-crenate ciliate. Flowers small white terminal and lateral distant. Calyx-tube glabrous, the elongated slender lobes scarcely as long as the tube, lanceolate acute entire.—Description after Vatke.

Nile Land. Soturba, *Schweinfurth.*

6. **SPHENOCLEA,** Gærtn.; Benth. et Hook. f. Gen. Pl. ii. p. 560.

Calyx-tube adnate to the ovary, hemispherical; limb 5-partite, lobes rounded, imbricate. Corolla campanulate, 3-lobed, valvate. Stamens free from the corolla or only slightly attached to its base; filaments dilated at the base; anthers short, free. Ovary half-inferior, 2-celled; placentas stipitate; ovules numerous. Style short; stigma at length shortly bifid. Capsule depressed, globose, dehiscing transversely, operculum carrying away the calyx-lobes. Seeds numerous, very small.

The genus is limited to the species described below.

1. **S. zeylanica,** *Gærtn. Fruct.* i. p. 113, t. 24, fig. 5. An erect glabrous annual, 1–4 ft. high, with a stout fleshy slightly branched stem. Leaves alternate, linear-lanceolate, acute, entire, from 1–6 in. long, according to the vigour of the plant. Flowers greenish yellow, about 2 lines in diameter, in dense bracteate spikes from 1–3 in. long —Wight Ill. t. 138.

Upper Guinea. Nupe, *Barter;* Cameroons River, *Mann!*
Lower Guinea. Congo, *Smith!*
Nile Land. Nubia, *Kotschy.*
Mozamb. Distr. Several places on the Zambesi, *Kirk!*
Also common in marshy places in Tropical Asia and America.

7. **CAMPANULA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 561.

Calyx-tube adnate to the ovary, hemispherical, turbinate or obovoid; limb deeply 5-lobed or partite, the sinuses furnished with flattened reflexed appendages or naked. Corolla campanulate, rarely funnel-shaped or nearly rotate, more or less deeply 5-lobed. Stamens free from the corolla; filaments usually dilated at the base; anthers free. Ovary inferior, 3- or 5-celled; ovules numerous; stigma 3- or 5-fid, lobes narrow. Capsule crowned by the persistent calyx-lobes, dehiscing laterally between the ribs in separate valves.—Perennial or rarely annual herbs of various habit, foliage and inflorescence. Flowers usually blue, rarely violet, pink or white.

A genus of more than 200 species, widely dispersed in the northern hemisphere, and especially abundant in the eastern part of the Mediterranean region.

Flowers dimorphic; fertile ones very small, apetalous . . 1. *C. dimorphantha.*
Flowers all petalous.
Stems erect, furrowed, with distant leaves . . . . . 2. *C. Quartiniana.*
Stems ascending or procumbent, with crowded leaves . . 3. *C. rigidipila.*

1. **C. dimorphantha,** *Schweinfurth Beitr. Fl. Æthiop.* p. 140. An erect pubescent annual, 6–9 in. high, branching from the base. Leaves alternate, pubescent, crenulate-dentate, the lower ones ovate or obovate, spathulate, narrowed into a distinct petiole, about an inch long, the upper ones narrower, ovate-lanceolate, linear-lanceolate, sessile. Flowers dimorphic; fertile ones about a line long, arranged in terminal and axillary cymes, apetalous and almost or quite closed; calyx pilose, lobes entire, lanceolate or linear subulate, inappendiculate; sterile ones solitary and scattered along the simple stems, with a calyx and corolla nearly 6 lines long. Corolla pubescent on the outside, blue, equalling the calyx. Anthers linear; filaments not dilated at the base. Capsule of the fertile flowers erect, 3- or rarely 4-celled, many-seeded.

Nile Land. Nubia, near the village of Farek, *Ehrenberg!*
Also in Upper Egypt, *Figari.*
The description is chiefly from Schweinfurth, the Kew specimens bearing only fertile apetalous flowers.

2. **C. Quartiniana,** *Rich. Fl. Abyss.* ii. p. 5. Perennial, with an erect branching furrowed hispid stem, a foot or more high. Leaves

alternate, distant, sessile, oblong-elliptical, acute or oblanceolate, distantly and obsoletely dentate, hispid on both sides, 1½–2 in. long. Flowers of medium size, solitary, terminal, erect. Calyx-lobes lanceolate, acute, strigose-ciliate; appendages triangular. Corolla hispid on the midrib; lobes somewhat obtuse. Capsule depressed, turbinate, 3-celled.—Description chiefly from Richard.

Nile Land. Abyssinia, *Quartin Dillon!*

This is perhaps only a form of *C. rigidipila*, as one of the characters, the hispid midrib of the corolla-lobes, on which Richard lays considerable stress, is of little value. In some of the specimens of *C. rigidipila* the corolla is glabrous, whilst in others it is hispid. Vatke regards it as a variety of *C. rigidipila.*

3. **C. rigidipila,** *Steud. et Hochst. in Rich. Fl. Abyss.* ii. p. 3. A perennial with a stout woody rootstock, from which numerous procumbent or ascending stems proceed, varying from 6–12 in. in length, clothed, when young at least, with long hispid or almost bristly hairs. Leaves sessile, elliptical-lanceolate, oblong or obovate, acute or obtuse, entire or remotely and obscurely toothed, more or less hispidly pilose, from 3–12 lines long. Flowers solitary, terminal, from 4–6 lines in diameter. Calyx-lobes lanceolate, acute, strigose-ciliate, about half as long as the corolla; appendages triangular, acute. Corolla-lobes glabrous or hispid on the midrib, rounded.—*C. sarmentosa,* Hochst.; Rich. Fl. Abyss. ii. p. 4. *C. Schimperi,* Vatke in Linnæa xxxviii. p. 712.

Nile Land. Abyssinia, *Schimper! Roth!*

C. esculenta, Rich. Fl. Abyss. ii. p. 4, of which no authentic specimen exists at Kew, is said to differ from this in its shorter calyx-lobes and appendages and the shape of its leaves, but the description given applies very well as far as it goes to *C. rigidipila.*

Order LXXVI. ERICACEÆ. (By Prof. Oliver.)

Flowers regular (or nearly so), hermaphrodite. Calyx free, 4–5-fid or -partite. Corolla hypogynous, deciduous or marcescent, in our genera tubular, campanulate or urceolate; mouth shortly 4–5-lobed. Stamens hypogynous or very shortly adnate to corolla-tube, as many or twice as many as corolla-lobes; filaments free; anthers dehiscing by terminal pores. Ovary 4–5-celled (in our species), free; style 1; stigma terminal. Ovules indefinite, few or many. Fruit capsular, loculicidally dehiscent. Seeds albuminous.—Shrubs, undershrubs usually wiry, or small trees. Leaves alternate or whorled, usually persistent, exstipulate. Inflorescence various.

A considerable Natural Order, very sparingly represented in Africa, excepting in the Cape region.

Corolla deciduous.	Leaves oval, 2–4 in. long	1. Agauria.
Corolla persistent.	Leaves acicular or minute.	
	Stamens 8	2. Erica.
	Stamens 4–5.	
	Flowers ebracteolate	3. Ericinella.
	Flowers bracteolate	4. Blæria.

1. **AGAURIA,** Hook. f. (*Leucothois* sect. *ex parte*, DC. Prod. vii. 602) ; Benth. et Hook. f. Gen. Pl. ii. p. 586.

Calyx free, persistent, deeply 5-fid. Corolla tubular-urceolate, with 5 short ovate teeth. Stamens 10, hypogynous or very slightly adnate to base of corolla ; filaments subulate-filiform, pilose ; anthers dehiscing by 2 rather broad slightly oblique pores. Ovary 5-celled ; style about equalling the corolla ; ovules indefinite, ascending from a basal placenta. Capsule loculicidally 5-valved, without a central persistent axis.—Small trees or shrubs, glabrous in our species, with alternate oval or oblong-lanceolate acute coriaceous petiolate leaves and flowers in unilateral axillary racemes, often clustered at the extremities.

A small genus confined to Africa, Madagascar and the Mascarene Islands.

1. **A. salicifolia,** *Hook. fil. l.c.* p. 586, var. *pyrifolia.* Tree of 15–25 ft. Leaves $2\frac{1}{2}$–3 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. broad ; petiole usually about $\frac{1}{2}$ in. long. Racemes shorter than or overtopping the upper leaves ; flowers 'red brown.'—*Leucothoë angustifolia* (mistake for *salicifolia*), DC. var. *pyrifolia*, Hook. fil. in Journ. Linn. Soc. vi. 15 and vii. 205.

Upper Guinea. Cameroons Mountains, 4–9,000 ft., and Clarence Peak, Fernando Po, 8,500 ft., *Mann !*

Occurs also in the Mascarene Islands.

2. **ERICA,** Linn. ; Benth. et Hook. f. Gen. Pl. ii. p. 590.

Calyx deeply 4-fid or 4-partite, persistent. Corolla marcescent, campanulate or suburceolate in our species ; teeth ovate-rotundate. Stamens 8, hypogynous, free ; filaments glabrous ; anthers dehiscing by large oblique pores, with or without appendages. Ovary 4-celled, with indefinite ovules in our species. Capsule globose, loculicidally 4-valved ; valves separating more or less from the axis.—Wiry shrubs with short needle-like or narrow-linear usually verticillate leaves. Flowers pedicellate, racemose or variously clustered.

A very large genus of the Western continents of the Old World, most numerous in species at the Cape of Good Hope.

1. **E. arborea,** *Linn. ; DC. Prod.* vii. 690. Shrub of 5–6 ft. (occasionally 50 ft. in Madeira, *Lowe*) ; extremities shortly pubescent-tomentose with intermingled short patent minutely barbellate hairs. Leaves narrow-linear, ascending, $\frac{1}{6}$–$\frac{1}{3}$ in. long, minutely puberulous or glabrate, shortly petiolate. Flowers usually clustered towards the extremities of short lateral branches, often confluent and forming leafy racemes. Calyx deeply 4-fid ; segments elliptical or ovate-elliptical. Corolla 2–4 times longer than the calyx. Anthers included, bifid ; cells dehiscing by a very oblique pore, each with a basal ciliolate or erose obtuse membranous appendix from the back.—*E. acrophya*, Fresen. in Flora, 1838, p. 604.

Wile Land. Abyssinia, *Schimper ! Q. Dillon and Petit ! Rüppell !*

I do not find the difference in the form of the anther-appendix noted by Fresenius, l.c., to hold good as distinguishing the Abyssinian plant from the South European and Madeiran species.

3. **ERICINELLA,** Klotzsch; Benth. et Hook. f. Gen. Pl. ii. p. 591.

Calyx deeply 4-fid or 4-partite, one segment (or two) larger than the rest. Corolla marcescent campanulate, 4-lobed. Stamens 4–6, included or shortly exserted; anthers bifid, dehiscing by elongate oblique pores, unappendaged (or aristate). Ovary 3–4-celled; stigma broadly peltate with 3–4 radiate tubercles on the disk; ovules several or numerous. Capsule globose, loculicidally 3–4-valved; valves separating from the axis.—Shrubs or small trees, with narrow verticillate heath-like leaves. Flowers as in *Erica*, ebracteolate.

A small genus chiefly of South Africa and Madagascar.

1. **E. Mannii,** *Hook. fil. in Journ. Linn. Soc.* vi. 16. A shrub of 3–12 ft. with erect fastigiate branches; extremities puberulous and with spreading short barbellate hairs. Leaves erect in whorls of 3, glabrous. Flowers small, chiefly clustered at the extremities of short lateral branchlets. Stamens 5–6; anthers somewhat cuneately narrowed at the base, unappendaged, equalling the corolla. Style shortly exserted.—Bot. Mag. t. 5569.

Upper Guinea. Cameroons Mountains, 4–12,000 ft., and Clarence Peak, Fernando Po, 10,000 ft., *Mann!*

Dr. Kirk sends from Mafia Island (about 9 miles from the mainland of Zanguebar) what is probably another species of this genus, but the flowers are not well developed. It 'grows in masses, about 10 ft. in height.' Rev. C. New also collected in Kilimanjaro barren specimens of an Ericaceous shrub probably referable to this genus, as also of a second, with flowers too young for satisfactory analysis, which may prove to be a *Philippia*.

4. **BLÆRIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 592.

Flowers 4-merous (rarely 5-merous); calyx 4-partite; segments equal. Corolla tubular dilated above, campanulate or globose, 4-lobed. Stamens 4; anthers 2-lobed or 2-fid, with basal aristæ or unappendaged. Ovary 4-celled; ovules indefinite; stigma small (or large and discoid). 'Capsule loculicidally 4-valved.'—Low heath-like shrubs, with alternate or verticillate leaves and flowers in terminal racemes (or capitate or umbellate).

A genus of about 15 species, except the following South African.

1. **B. spicata,** *Hochst.*; *Rich. Fl. Abyss.* ii. 13. Six inches to one foot or more from a wiry decumbent base; extremities more or less glandular hirsute-pubescent. Leaves in whorls of 3 or occasionally alternate, linear, or linear-lanceolate, with revolute margins sparsely hirsute or glandular-ciliate. Flowers 1½ to nearly 3 lines long, from the upper axils, forming leafy often congested racemes. Calyx-segments linear-lanceolate, ½–⅓ as long as corolla, ciliate. Anthers 2-lobed, each cell with a short dorsal subulate appendix at the base; pore about half the length of the anther. Stigma small, capitate.—*B. condensata*, Hochst. l. c.

Upper Guinea. Cameroons Mountains, 7–10,000 ft., and summit of Clarence Peak, Fernando Po, *Mann!*

Nile Land. Abyssinia, 12–12,000 ft., *Schimper!*
Mozamb. Distr. Kilima-njaro, last zone of vegetation, *New!* (a variety with the small corollas more abruptly dilated above and the slender style more exserted.)

ORDER LXXVII. PLUMBAGINEÆ. (By Prof. Oliver.)

Flowers regular, hermaphrodite. Calyx inferior, gamosepalous, tubular or infundibuliform, more or less distinctly 5-lobed. Corolla hypogynous, gamopetalous, hypocrateriform or petals nearly or wholly free, oblanceolate or obovate, imbricate. Stamens as many as and opposite to corolla-lobes or petals, adnate to the tube or base of the claw or inserted with the petals on a narrow hypogynous ring. Ovary free, 1-celled, often 5-sulcate; styles 5, free from the base or connate more or less. Ovule solitary, anatropous, suspended from a long basal funiculus. Fruit dry, dehiscent or indehiscent; seed with or without albumen; embryo straight.—Herbs or shrubs, often maritime, with cauline alternate or radical rosulate leaves. Flowers capitate or spicate, spikes solitary or panicled.

An order chiefly affecting the seashore or saline regions, most numerous in species in the Mediterranean region and West Asia.

Maritime herbs. Calyx dilated above and hyaline. Styles free or nearly so	1. STATICE.
Herbs or scandent and shrubby. Calyx tubular, glandular. Styles connate below	2. PLUMBAGO.
Shrub. Calyx tubular, eglandular. Styles connate below	3. CERATOSTIGMA.

1. STATICE, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 625.

Calyx funnel-shaped; limb plicate, hyaline or scarious, 5-toothed or lobed in our species. Petals 5, either free from the base or the base of the claw connate in a narrow ring, oblanceolate or obcaudate. Stamens adnate to base of the petals. Styles free from the base or nearly so. Utricle indehiscent, or circumsciss or variously fissured.—Usually perennial herbs from a woody or wiry stock, or more or less shrubby and diffusely branched. Leaves alternate, often rosulate or fascicled, linear-spathulate to obovate and entire or nearly so in our species, in others often sinuate or pinnatifid. Flowers in unilateral bracteate panicled spikes.

A large maritime genus chiefly of the northern hemisphere. But one of the following species is peculiar to our Flora.

1. **S. tuberculata,** *Boiss. in DC. Prod.* xii. 662. Radical leaves wanting in our specimens. Scape glabrous, about 6 in. high together with all its branches and the peduncles closely covered with lax tubercles, the larger of which are depressed and foraminate, more or less zigzag, with widely divergent or recurved branches from below the middle; lower branchlets sterile. Spikelets 1-flowered, clustered in short dense subscorpioid spikes collected in distichous pyramidal panicles; inner bract 2–3 times longer than the outer, closely investing

the flower, obtuse with a scarious margin. Calyx glabrous; margin undulate-lobate with 5 mucroniform teeth.

Upper Guinea. Cape Blanco, 'covering the sandstone flats, above the cliffs,' *Capt. Boteler!*

Statice pectinata, Ait. and *S. Brunneri*, Webb. (the latter, I think, a form of *S. pectinata*), are likely to occur in the same region. They are found in the Cape Verde Archipelago.

2. **S. axillaris,** *Forsk.; Boiss. in DC. Prod.* xii. 663. A low shrub with decumbent or ascending leafy branches or scapes erect from a woody stock. Leaves oblanceolate or oblanceolate-spathulate, entire or retuse, glabrous, fleshy, with the petiole 1–2½ in. in length. Scape erect, subterete, smooth, glabrous, ½–1 ft. in height, all the branches usually floriferous. Inner bracts glabrous or nearly so, coriaceous, smooth, with scarious margin, about 3 times longer than the outer. Calyx more or less pilose below; margin with shallow rotundate-deltoid lobes.—*S. Bovei*, Jaub. et Spach. Ill. Pl. Or. i. p. 157, t. 86.

Nile Land. Nubia and Abyssinia (Schweinf. et Aschers. Enum. 288) Red Sea, between 10°–12° N. Lat., *Lord!*

Also at Aden. Dr. Anderson, in his 'Florula Adenensis,' p. 29, cites *S. lanceolata*, Edgew., as a synonym. *Taxanthemum attenuatum*, R. Br. in Salt App. p. 64, is probably referable to this species.

2. **PLUMBAGO,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 627.

Calyx tubular, 5-toothed, more or less clothed with prominent stipitate glands. Corolla hypocrateriform. Stamens hypogynous. Ovary narrowed into the slender style which divides above into 5 longitudinally stigmatose branches. Capsule membranous, included in the persistent calyx.—Perennial herbs or shrubby occasionally scandent, with alternate membranous entire leaves (aphyllous in one species) and beautiful white, rose or blue flowers in terminal spikes.

A wide-spread genus in warm countries.

Leaves ovate; petiole narrow excepting at base. Calyx strongly glandular	1. *P. zeylanica.*
Leaves obovate-elliptical; petiole broadly winged. Calyx thinly glandular	2. *P. amplexicaulis.*

1. **P. zeylanica,** *Linn.; Boiss. in DC. Prod.* xii. 692. Shrubby, with ascending or somewhat scandent terete longitudinally striate branches. Leaves ovate or ovate-lanceolate, acute, base rounded or more or less cuneately narrowed into the petiole, the larger varying from 1½ to 4 in. in length; petiole narrow but amplexicaul at base and occasionally auricled. Bracts ovate acuminate, ¼–⅓ length of calyx; lateral bracteoles narrower. Calyx ½ in. long or thereabout, strongly glandular-setose. Corolla white; tube considerably exceeding the calyx.—*P. auriculata*, Hochst. in Hb. Kotzsch. Nub. et (fide Rich.) in Herb. Schimp. Abyss.

Widely spread in Tropical Africa. I have not however seen specimens from either the North or South Central divisions.

Also in Tropical Asia, Australia, &c.

2. **P. amplexicaulis,** *Oliv. in Journ. Linn. Soc.* xv. 96. Branches puberulous or glabrate, longitudinally sulcate. Leaves 2–5 in. long, obovate-elliptical, broadly pointed, glabrous, continued below into the broadly alate petiole, which is conspicuously auricled at base. Flowers blue, in panicular spikes. Bracts ovate, shortly apiculate. Calyx costate, puberulous, sparingly glandular, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Corolla-lobes mucronate with the produced apex of the slender median nerve. Anthers exserted.

South Central. Region about Lake Tanganyika, *Cameron!*
Not identified from elsewhere.

3. **CERATOSTIGMA,** Bunge; Benth. et Hook. fil. Gen. Plant. ii. p. 628.

Differs from *Plumbago* in the eglandular calyx; stamens adnate, half the length of the tube of the corolla; and the capitate rather than spicate flowers.

A small genus of temperate Asia and Abyssinia. Our species is peculiar to this Flora, though nearly allied to a Himalayan one.

1. **C. abyssinicum,** *Asch. in Schweinf. et Asch. Enum.* p. 288. A shrub of 3–5 ft., with sulcate appressed-setose rigid somewhat zigzag branches. Leaves oval or lanceolate, acute, narrowed to the base, setulose above and beneath and setose-ciliate, sessile or shortly petiolate, 1–1$\frac{1}{2}$ in. long or smaller. Heads terminal, several-flowered. Bracts broadly ovate, cuspidate-acuminate, setulose and with a few long marginal bristles. Calyx tubular, acutely 5-lobed, strongly 5-costate; ribs smooth; intercostal spaces setulose. Corolla "violet" or "rose;" tube half as long again as calyx; segments of limb "oblong."—*Valoradia abyssinica,* Hochst.; Boiss. in DC. Prodr. xii. 695; *V. patula,* Hochst. l. c. et in Flora, 1842, p. 240 (with glabrate stem and leaves more glabrous above).

Nile Land. Abyssinia, *Schimper! Kretschmer.*

Order LXXVIII. PRIMULACEÆ. (By Prof. Oliver.)

Flowers regular, hermaphrodite. Calyx free or more or less adnate to the ovary below (*Samolus*) 5-fid or 4–5-partite in our species. Corolla hypogynous (when the ovary is free), rotate or subcampanulate, 4–5-fid or -partite, or hypocrateriform, with a spreading 5-partite limb. Stamens as many as corolla-lobes, inserted upon the tube or lobes, opposite to the lobes. Ovary free (except in *Samolus*), 1-celled, with a free central placenta and indefinite ovules.—Herbs. Leaves radical or cauline, exstipulate. Inflorescence various.

A small Natural Order, most numerous in the cooler regions of the north temperate zone.

Corolla imbricate. Ovary free.
- Leaves radical. Corolla hypocrateriform . . . . . 1. Primula.
- Leaves alternate. Corolla campanulate . . . . . 2. Ardisiandra.

Corolla contorted, rotate or infundibuliform.
- Capsule dehiscing longitudinally . . . . . 3. Lysimachia.

Capsule circumsciss.
Flowers 5-merous . . . . . 4. ANAGALLIS.
Flowers 4-merous . . . . . 5. CENTUNCULUS.
Corolla imbricate. Ovary adherent . . . . . 6. SAMOLUS.

1. **PRIMULA,** Linn.; Benth. et Hook. f. Gen. Plant. ii. p. 631.

Calyx campanulate or tubular, 5-lobed, persistent. Corolla hypogynous, hypocrateriform. Stamens included. Ovary multiovulate; style slender; stigma capitate. Capsule globose, 5-valved, with entire or bifid valves.—Perennial herbs, with radical rosulate leaves and whorled (or umbellate, rarely solitary), white rose purple or yellow flowers.

A considerable genus, especially of Alpine and sub-Alpine regions of the Northern Hemisphere in the Old World.

1. **P. verticillata,** *Forsk. Fl. Ægypt.-Arab.* p. 42. Leaves obovate-spathulate or oblanceolate, usually acute or broadly pointed, narrowed into a rather long more or less alate petiole, unequally dentate-serrate, glabrous above, more or less farinose at least at first beneath, with the petiole from 2 to 8 in. long. Scape erect, ¼–1 ft. or taller, usually with 2–3 involucrate whorls of pedicellate pale yellow flowers; bracts of involucre sessile, lanceolate, elliptical or obovate, acute, unequally serrate or dentate, usually equalling or exceeding the pedicels. Calyx campanulate, 5-fid, mealy or glabrous; segments lanceolate or ovate-lanceolate, entire or toothed, 2–5 times shorter than the slender tube of the hypocrateriform corolla.—*P. Boveana*, Decaisne; DC. Prodr. viii. p. 35; *P. simensis*, Hochst. in Hb. Schimp. Abyss.; Jaub. et Spach. Ill. Pl. Or. v. t. 440; Bot. Mag. t. 6042. Dr. Schweinfurth distinguishes two varieties (Beitr. Fl. Æthiop. 86) *α. farinosa*, farinose, with smaller leaves, and *β. simensis*, nearly or quite destitute of meal and with the leaves equalling the scape.

Nile Land. Abyssinia, *Schimper! Quartin-Dillon and Petit!*
Also in Arabia.
A variable plant in dimensions, relative length of corolla, form of calyx-lobes, and farinose investment.

2. **ARDISIANDRA,** Hook. fil.; Benth. et Hook. f. Gen. Plant. ii. p. 633.

Calyx 5-partite; segments ovate or ovate-lanceolate, acute. Corolla about equalling or scarcely exceeding the calyx, campanulate, 5-fid; segments obtuse. Stamens adnate to base of corolla-tube; filaments short, subulate; anthers ovate-lanceolate, apiculate. Ovary globose, multiovulate, free; style slender; stigma capitellate. Capsule included, dehiscing by 5–8 cartilaginous valves, many-seeded. Embryo transverse.—Creeping herb, thinly pilose, with alternate, petiolate 5–6-lobate, incise-dentate, rotundate leaves, and extra-axillary solitary or 2–3-nate pedicellate white flowers.

Monotypic and not known from elsewhere.

1. **A. sibthorpioides,** *Hook. fil. in Journ. Linn. Soc.* vii. p. 205. Leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. long and broad, membranous, thinly and shortly pilose or glabrate above; petiole equalling the lamina. Pedicels shorter than the petioles. Flowers $\frac{1}{4}$ in. diam. Membranous wall of the ovary with 5 or 6 radiate thickenings around the style-base.

Upper Guinea. Cameroons Mountains and Fernando Po, 7,000–7,500 ft., *Mann!*

Analysis chiefly from Sir J. D. Hooker, l. c.

3. **LYSIMACHIA,** Linn.; Benth. et Hook. fil. Gen. Plant. ii. p. 635.

Calyx 5- (6-) partite; segments oval or lanceolate, persistent. Corolla hypogynous, rotate or infundibuliform, 5-partite; tube short; lobes contorted in æstivation. Stamens adnate to corolla-tube; "filaments free or connate below." Ovary globose; ovules free or numerous. Capsule 2–5-valved or fruit indehiscent. "Embryo transverse."—Erect or creeping herbs, with opposite alternate or whorled leaves and axillary solitary or geminate flowers or with a terminal raceme, spike or panicle.

A considerable genus, chiefly of temperate and subtropical countries of the Northern Hemisphere.

The following species appear to be confined to this Flora:—

Creeping herb. Flowers solitary, axillary. Corolla exceeding calyx . . . . . 1. *L. Quartiniana.*
Diffuse herb. Flowers solitary, axillary. Corolla shorter than calyx . . . . . 2. *L. adoënsis.*
Erect herb. Flowers in spiciform racemes . . . . . 3. *L. Ruhmeriana.*

1. **L. Quartiniana,** *A. Rich. Fl. Abyss.* ii. 16, tab. 65. Prostrate or creeping glabrous herb, much resembling *L. Nummularia.* Leaves ovate- or rotundate-elliptical, obtuse or broadly pointed, entire, abruptly or sometimes cuneately narrowed into a petiole, about $\frac{2}{3}$–$\frac{3}{4}$ in. long, with petiole of 1–3 lines. Peduncles axillary, solitary, exceeding or equalling the leaf. Calyx-segments ovate-lanceolate, acute. Corolla-segments oblong-elliptical, obtuse, about twice as long as calyx. Style slender.—Klatt, Lysimachia, t. 15, fig. 2.

Nile Land. Abyssinia, Oudgerate, *Petit!*

Richard describes the flowers as rose-coloured.

2. **L. adoënsis,** *Hochst. et Steud.; Klatt. Monog. Lysim.* p. 38, tab. 21, fig. 2. Diffuse annual glabrous herb, much resembling scarlet pimpernel (*Anagallis*). Branches angular. Leaves (upper) sessile or subsessile, opposite, acute. Peduncles equalling or exceeding the leaves, at length recurved. Calyx-segments narrowly lanceolate, acute. Corolla "golden yellow," shorter than calyx. Fruit globose, equalling the calyx.—*Asterolinon? adoense,* Kunze in Linnæa, xx. p. 37.

Nile Land. Abyssinia, *Schimper!*

3. **L. Ruhmeriana,** *Vatke in Linnæa,* vol. xl. p. 204 (1876). Erect glabrous herb, 1–3 ft., simple or sparingly branched from the upper axils. Leaves opposite or the uppermost and lowest alternate,

elliptical, ovate or ovate-lanceolate, obtuse or subacute, sessile, subamplexicaul or the lower shortly petiolate, 1½–3 in. more or less. Flowers "white," in dense terminal spiciform racemes 1–2½ in. long; a pair of leaves usually at the base of the inflorescence. Bracts exceeding the very short pedicels. Calyx-segments oblong-lanceolate, rather obtuse, with narow pale margins rather shorter than the coriaceous globose capsule, which is crowned by a very short stout style. "Corolla-segments ovate-lanceolate, obtuse, eglandular" (Vatke).

Nile Land. Abyssinia (1868 No. 1231), *Schimper!*

4. **ANAGALLIS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 637.

Calyx 5-partite; segments narrow. Corolla hypogynous, rotate, 5-partite. Stamens adnate to base of segments of the corolla. Ovary globose; style filiform; stigma capitellate. Capsule globose, circumsciss about the equator, many-seeded.—Herbs, with solitary, axillary, scarlet, blue or rose flowers.

A small but widely dispersed genus; the following species is cosmopolitan.

1. **A. arvensis,** *L.; DC. Prodr.* viii. p. 69. Diffuse glabrous herb, with opposite, sessile, ovate or elliptic-lanceolate leaves and solitary axillary flowers, on peduncles at length recurved, equalling or exceeding the leaves. Calyx-segments linear-lanceolate, with at length a strong midrib.

Nile Land. Abyssinia, *Schimper!* Nubia, Sennaar, *Schweinf. et Asch. Enum.* p. 273.

5. **CENTUNCULUS,** Linn.; Benth. et Hook. f. Gen. Plant. ii. p. 637.

Characters of *Anagallis*, excepting that the flowers are 4-merous; the corolla 4-fid, shorter than the calyx, with stamens inserted in the throat.—Small glabrous annual herbs, with alternate or opposite leaves and axillary shortly pedicellate or sessile flowers.

A small wide-spread genus.

1. **C. minimus,** *L.; DC. Prodr.* viii. p. 72.

Nile Land. Abyssinia, summit of Mount Semajata, *Schimper!* (fide Vatke in Linnæa, 40, p. 205 (1876).

6. **SAMOLUS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 138.

Calyx campanulate; tube adnate to the ovary; limb 5-fid. Corolla shortly campanulate, 5-lobed, with staminodia or squamæ alternating with the lobes. Stamens short, inserted in the tube of the corolla. Ovary inferior; apex free. Capsule many-seeded, dehiscing by 5 apical valves.—Leaves alternate. Flowers small, white.

A small genus, chiefly of the Southern Hemisphere, excepting the following, which is cosmopolitan.

1. **S. Valerandi,** *L.; DC. Prod.* viii. p. 73. A glabrous erect herb, from a few inches to 2 or 3 ft. in height, simple or branched.

Radical leaves obovate or elliptical, obtuse, narrowed into petiole; cauline obovate or oblanceolate, more shortly petiolate. Flowers on slender ascending or spreading pedicels, with a minute bract near the middle, in terminal lax racemes.

North Central. Bornou (*R. Brown in Denham and Clapperton*, App.).
Nile Land. Abyssinia (*Schweinf. et Aschers. Enum.* 273).
One of the most widely diffused Phanerogams.

Order LXXIX. **MYRSINEÆ.** (By J. G. Baker.)

Flowers regular, hermaphrodite or polygamo-dicœcious. Calyx minute, campanulate, persistent, with 4–6 imbricate or valvate teeth, entirely free from the calyx, except in *Mæsa*. Corolla usually monopetalous, rotate, with as many segments as the calyx, in *Embelia* polypetalous. Stamens as many as the segments of the corolla and inserted opposite to them at their base; filaments subulate, long or short; anthers 2-celled, with loculicidal dehiscence, often cuspidate with the produced connective. Staminodia 0 in the Tropical African genera. Ovary 1-celled, with a free central placenta; ovules many or few; style simple, short or produced; stigma various. Fruit small, globose, except in *Mæsa* 1-seeded, with usually a firm endocarp and a thin fleshy mesocarp. Seed with abundant uniform or ruminate albumen.—Trees or shrubs, erect or climbing, usually glabrous; leaves alternate, exstipulate, simple, usually petioled, entire or toothed, often furnished with copious black resinous dots or lines; flowers small, variously arranged, whitish or tinged with red, often dotted with glands like the leaves.

An Order of 500 species, mainly restricted to the Tropical regions of both Hemispheres; represented in this Flora by a very small proportion of species.

Ovary adnate to the calyx. Seeds many . . . . . 1. MÆSA.
Ovary free from the calyx. Seed solitary.
  Flowers in axillary fascicles . . . . . 2. MYRSINE.
  Flowers in racemes or panicles.
    Corolla gamopetalous, contorted . . . . . 3. ARDISIA.
    Corolla polypetalous, imbricate . . . . . 4. EMBELIA.

1. **MÆSA,** Forsk.; Benth. et Hook. f. Gen. Pl. ii. 641.

Flowers hermaphrodite or polygamo-dicœcious. Calyx campanulate; tube adnate to the ovary; teeth 5, minute, deltoid, persistent, imbricate in bud. Corolla campanulate, with a short tube and 5 imbricated roundish or deltoid segments. Stamens 5, very small, inserted in the corolla-tube; anthers globose. Ovary adnate to the calyx-tube except at the top; style short, cylindrical; stigma capitate; ovules numerous, inserted on a turbinate placenta. Fruit small, globose, dry or fleshy, tipped with the persistent style and stigma. Seeds minute, angular, flattened at the top.—Erect or climbing trees or shrubs with glabrous or pubescent branchlets, entire or serrated leaves, not rigidly coriaceous in texture nor crowded near the tip of the branchlets and

very abundant minute whitish flowers in simple or panicled axillary racemes with minute persistent bracts and bracteoles.

A genus of 30–40 species, spread through the tropical and warm temperate zones of the Old World.

A climber, with entire leaves cordate at the base . . . . 1. *M. cordifolia.*
An erect tree, with serrated leaves, cuneate at the base . . 2. *M. lanceolata.*

1. **M. cordifolia,** *Baker.* A climbing shrub, reaching a height of 15–20 ft., with slender glabrous branchlets. Leaves distinctly petioled, not visibly gland-dotted; petiole $\frac{1}{2}$–1 in.; blade ovate, subacute, broadly rounded at the base in the young leaves, cordate in those that are fully developed, which reach a length of $\frac{1}{2}$ ft., and a breadth of 4–5 in. below the middle; both surfaces green and glabrous; texture moderately firm; the main veins rather raised, parallel and arching, with usually a strong branch before they reach the edge. Flowers in shortly-peduncled axillary panicles 4–8 in. long, with compound spreading or ascending glabrous or slightly pilose branches; pedicels $\frac{1}{2}$–1 line; bracts lanceolate, very minute, persistent. Flower-calyx 1 line in diameter when expanded, the adnate campanulate glabrous tube clasped by two very minute ovate ciliated bracteoles; teeth minute, deltoid. Corolla $\frac{1}{8}$ in. across when expanded; lobes orbicular. Stamens inserted in the corolla-tube; minute globose anther as long as the filament. Fruit globose, glabrous, $\frac{1}{6}$ in. diameter, free at the top from the calyx. Style very short; stigma entire.

Upper Guinea. Cameroons Mountains, 2500 ft., *Mann!*

2. **M. lanceolata,** *Forsk.; A. DC. Prodr.* viii. 38. An erect tree 20–30 ft. high, with slender usually glabrous branchlets. Leaves distinctly petioled, not perceptibly gland-dotted; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in.; blade oblong-lanceolate, 4–6 in. long, 2–$2\frac{1}{2}$ in. broad at the middle, acute, sharply serrated, cuneate at the base, moderately firm in texture, with distinctly-raised arching parallel main veins. Flowers in copious short-peduncled axillary panicles 2–4 in. long with compound lower branches; branches glabrous or finely pilose; pedicels finally about $\frac{1}{2}$ line long; bracts deltoid, persistent, about as long as the pedicel. Calyx under a line across when expanded; tube campanulate, clasped by 2 minute ovate ciliated bracteoles; teeth deltoid, minutely ciliated. Corolla $\frac{1}{8}$ in. diameter when expanded; segments deltoid. Stamens much shorter than the corolla-segments; anthers minute globose; filament scarcely any. Fruit globose, glabrous, $\frac{1}{6}$ in. diameter, free from the calyx for a space at the top, filled by the very numerous angular brown seeds; style much longer than in *M. cordifolia*; stigma capitate.—*M. picta*, Hochst. in Schimp. Pl. Abyss. no. 186; *M. indica*, Hook. f. in Journ. Linn. Soc. vi. 16, vii. 206, non A. DC.; *M. rufescens*, A. DC. Prodr. viii. 81.

Upper Guinea. Cameroons Mountains, at 4000–7000 ft., and Clarence Peak, Fernando Po, at 5000 ft., *Mann!*

Nile Land. Mountains of Abyssinia, *Schimper! Capt. Pullen! Dr. Roth!*

Mozamb. Distr. Mount Kilima-njaro, *Rev. C. New.*

Also Arabia. This seems to me distinct from the common Asiatic *M. indica*, A. DC. by its much more compound inflorescence and shorter pedicels, but I should refer here as a variety with pilose branchlets and other parts, the Natal *M. rufescens*, A. DC.

2. **MYRSINE**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 642.

Flowers polygamous. Calyx persistent, minute, entirely free from the ovary, with generally 5, rarely 4, deltoid imbricate teeth. Corolla rotate, with as many segments as the calyx and a very short tube. Stamens inserted at the throat of the corolla tube, as many as the imbricate segments and opposite to them; filament 0 or very short; anther lanceolate, cuspidate. Ovary globose; style short, cylindrical; stigma capitate; ovules few. Fruit small, globose, dry or fleshy, 1-seeded. Seed the same shape as the fruit, sessile, with abundant horny sometimes slightly ruminate albumen.—Erect or procumbent trees or shrubs, with branchlets usually stout, the mostly entire leaves crowded near their tips and the copious small whitish flowers sessile or pedicellate in umbels from the branchlets below the leafy part.

A genus of eighty species, spread round the world principally in the Tropical zone; two out of the four Tropical African species are abundant at the Cape.

Leaves small, toothed, not crowded towards the end of the branchlets, with the flowers in their axils . . . . . 1. *M. africana.*
Leaves comparatively large, entire, crowded towards the end of the branchlets, with the flowers below them.
Stamens exserted. Leaves obovate-oblong . . . . . 2. *M. querimbensis.*
Stamens included. Leaves oblong or oblanceolate-oblong.
Pedicels as long as the flower or fruit . . . . . 3. *M. melanophlæos.*
Pedicels twice as long as the flower or fruit . . . . . 4. *M. simensis.*

1. **M. africana,** *Linn.; A. DC. Prod.* viii. 93. A low very much branched shrub, with very slender pilose or glabrous branchlets, with the abundant leaves spaced all down them. Leaves subsessile, obovate or oblong, $\frac{1}{2}$—$\frac{3}{4}$ in. long, obtuse or acute, finely serrated, cuneate at the base, subcoriaceous, green and glabrous on both sides or a little pubescent beneath, with only the midrib prominently raised. Flowers in copious globose sessile clusters in the axils of the leaves, as many as 10 or 12 to a cluster. Calyx very minute, with a short turbinate tube and usually 5, rarely 4, orbicular much imbricated segments. Corolla $\frac{1}{24}$ in. across when expanded; tube very short; segments oblong. Stamens very large for the size of the flower; anthers oblong, cuspidate, much exserted; filaments very short. Fruit glabrous, globose, bright brown, $\frac{1}{6}$ in. diameter; style short, cylindrical; stigma minute, capitate, entire.

Nile Land. Mountains of Abyssinia, *Schimper! Plowden! Roth! Quartin-Dillon and Petit!* &c.
Also the Cape and Azores.

2. **M. querimbensis,** *Klotzsch in Peters Mossamb. Bot.* i. 185. A shrub or small tree, glabrous except a little ferruginous or grey tomentum on the young branchlets. Leaves crowded towards the top of the branchlets; petiole $\frac{1}{2}$—$\frac{3}{4}$ in., bordered by a narrow wing; blade

obovate-oblong, 2–4 in. long, 1½–1¾ in. broad above the middle, narrowed gradually from the middle to the base, entire, subcoriaceous, without any perceptible dotting, the main veins fine and arching. Flowers in dense sessile clusters of 6–10 each on the stout branchlets below the leafy part. Calyx campanulate, $\frac{1}{16}$ in. diameter in the flowering stage, with a very short tube and 5 round-deltoid much imbricated segments. Corolla $\frac{1}{12}$ in. long, with a short tube and 5 oblong segments. Stamens inserted at the throat of the tube, with a filament nearly or quite as long as the exserted lanceolate anther. Fruit globose, glabrous, $\frac{1}{5}$ in. diameter, clasped by the accrescent spreading rigidly coriaceous calyx (now $\frac{1}{6}$ in. diameter) and furnished with a very short stout pedicel.

Mozamb. Distr. Querimba, *Dr. Peters!* Rovuma Bay, Quiloa and Quillimane, in jungles near the sea, with *Avicennia, Dr. Kirk!*

3. **M. melanophlæos,** *R. Br.; A. DC. Prodr.* viii. 97. An erect tree, 40–50 ft. high, glabrous in all its parts. Leaves crowded near the top of rather stout branchlets; petiole very short ($\frac{1}{4}$–$\frac{1}{3}$ in.) winged nearly to the base; blade oblong or oblanceolate-oblong, 3–5 in. long, 18–21 lines broad at the middle, subobtuse, entire, deltoid at the base, green and glabrous on both sides, without any perceptible dotting, the close erecto-patent main veins not much raised. Flowers in crowded clusters of 4–6 placed mainly below the leaves, often on raised nodes, on glabrous pedicels about as long as the flower or fruit. Calyx campanulate, coriaceous, glabrous, $\frac{1}{12}$ in. across when fully expanded; teeth deltoid, as long as the tube. Corolla $\frac{1}{8}$ in. long, with a short tube and oblong reflexing segments. Anthers lanceolate, subsessile at the throat of the corolla-tube, shorter than the segments. Fruit globose, glabrous, $\frac{1}{6}$ in. diameter, tipped with the very short persistent style.

Upper Guinea. Cameroons Mountains, at 4000–7500 ft., *Mann!*
A widely-spread Cape species.

4. **M. simensis,** *Hochst.; A. DC. Prodr.* viii. 97. A tall tree with a slender straight trunk, glabrous in all its parts. Leaves crowded near the top of the stout branchlets; petiole very short, winged nearly to the base; blade oblong, 3–4 in. long, 1–1½ in. broad at the middle, obtuse, cuneate at the base, subcoriaceous, glabrous on both sides, entire, without any perceptible dotting and the main veins little raised, fine, and wavy. Flowers in crowded clusters of 8–12 each, placed on the stout branchlets below the leaf-bearing part; pedicels stout, glabrous, $\frac{1}{4}$–$\frac{3}{8}$ in. Calyx campanulate, coriaceous, glabrous, $\frac{1}{12}$ in. diameter, with 5 deltoid teeth as long as the tube. Corolla $\frac{1}{6}$ in. long, with a very short tube and 5 oblong segments. Anthers lanceolate, subsessile at the throat of the corolla-tube, shorter than the segments. Fruit not seen.

Nile Land. Mountains of Abyssinia, *Schimper!*
Differs from *M. melanophlæos* mainly by its longer pedicels and more numerous flowers in a cluster.

3. **ARDISIA,** Sw.; Benth. et Hook. f. Gen. Pl. ii. p. 645.

Flowers hermaphrodite or polygamous. Calyx entirely free from the ovary, minute, campanulate; teeth deltoid, imbricate, usually 5. Corolla rotate, with a very short tube and usually 5 contorted segments. Stamens inserted at the throat of the corolla-tube, included; filaments very short; anthers comparatively large, lanceolate, cuspidate; ovules few or many immersed in the globose placenta. Fruit globose, with a thin fleshy mesocarp and crustaceous endocarp, 1-seeded. Seed globose, with copious horny uniform or ruminate albumen.—Trees or shrubs, glabrous or pubescent; leaves entire or toothed, usually petioled; flowers in the Tropical African species in congested lateral cymes; fruit often bright blue.

A genus of about 200 species, concentrated in the Tropical zone of Asia and America, none Cape.

Cymes placed in the axils of the petioled inciso-crenate leaves	1. *A. cymosa.*
Cymes placed on the stout branchlets below the sessile entire leaves	2. *A. bracteata.*

1. **A. cymosa,** *Baker.* An erect shrub, 2–3 ft. high, with branchlets thinly coated with ferruginous tomentum. Leaves petioled, not crowded towards the end of the branchlets; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., deeply channelled down the face; blade oblanceolate-oblong, 4–5 in. long, $1\frac{1}{2}$–2 in. broad at the middle, acute, inciso-crenate except at the cuneate base, membranous, green and glabrous on both sides, with copious minute black dots and fine erecto-patent main veins uniting in arches within the margin. Flowers 4–8 together in congested cymes in the axils of the leaves, with only minute deltoid bracts, on cernuous pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long clothed with ferruginous tomentum. Flower-calyx campanulate, $\frac{1}{12}$ in. diameter, with 5 deltoid teeth and abundant black glandular dots. Corolla $\frac{1}{6}$ in. long, with a very short tube and 5 oblanceolate-oblong dotted petals. Stamens inserted at the throat of the tube, included; filament very short; anther lanceolate, acute, $\frac{1}{12}$ in. long. Fruit glabrous, globose, $\frac{1}{4}$ in. diameter; style very slender, subulate, $\frac{1}{12}$ in. long; stigma minute.

Upper Guinea. Island of St. Thomas, at 2000 ft., *Mann!*

2. **A. bracteata,** *Baker.* An erect shrub 1–2 ft. high, glabrous in all its parts, with the sessile leaves crowded towards the top of the stout branchlets. Leaves oblanceolate-oblong, 4–5 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad at the middle, acute, entire, narrowed from the middle downwards but rounded at the very base, moderately firm in texture, green and glabrous on both sides, with copious minute black dots and fine ascending main veins. Flowers in congested cymes, which are sessile on the stout branchlets below the leafy part, mixed with copious obtuse oblong leaves $\frac{1}{6}$–$\frac{1}{4}$ in. long; pedicels very short, deflexed. Flower-calyx campanulate, $\frac{1}{12}$ in. diameter, copiously gland-dotted, with 5 round-deltoid imbricated teeth. Corolla $\frac{1}{6}$ in. long, with a very short tube and 5 oblong dotted petals. Anthers lanceolate, acute, $\frac{1}{12}$ in. long,

subsessile at the throat of the corolla-tube. Ovary globose; style produced, very slender. Fruit not seen.

Upper Guinea. Sierra del Crystal, *Mann!*

4. **EMBELIA,** Burm.; Benth. et Hook. f. Gen. Pl. ii. p. 1240; (*Samara,* Linn. Mant.)

Flowers hermaphrodite or polygamous. Calyx entirely free from the ovary, minute, campanulate, persistent; teeth usually 5, imbricate. Petals much longer than the calyx, free, deciduous, imbricate. Stamens as many as the petals, attached to the base; anthers oblong; filaments subulate, long or short. Ovary globose; style short or produced; stigma capitate, entire or lobed; ovules few, inserted on the subglobose placenta. Fruit small, globose, 1-seeded. Seed subglobose, with copious smooth, or ruminate albumen.—Trees or shrubs, usually climbers, glabrous or pubescent; leaves petioled, usually entire; flowers minute, whitish, disposed in simple or panicled lateral racemes.

A genus of about 50 species, spread through the tropical regions of the Old World; one Cape.

Leaves and branchlets tomentose . . . . . 1. *E. nilotica.*
Leaves and branchlets glabrous.
Petals $\frac{1}{12}$ in. long. Stamens exserted . . . . . 2. *E. guineensis.*
Petals $\frac{1}{8}$ in. long. Stamens as long as the petals . . . 3. *E. abyssinica.*

1. **E. nilotica,** *Oliver in Trans. Linn. Soc.* xxix. 105, t. 71. An erect tree, 30 in. in circumference of the stem, with stiff branches densely clothed with ferruginous tomentum. Leaves petioled, not crowded on the branchlets; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., densely ferrugineo-tomentose; blade obovate, 3–4 in. long, 2–3 in. broad, obtuse with a small cusp, cuneate at the base, entire, moderately firm in texture, not perceptibly gland-dotted, green on both surfaces, glabrous above, pubescent all over beneath, ferruginous on the raised erecto-patent main veins, which fork before reaching the edge. Racemes oblong, simple, one from the axil of each leaf, under 1 in. long inclusive of the short peduncle, which like the rachis is densely coated with ferruginous tomentum; lower pedicels spreading or deflexed, as long as the flowers; bracts minute, lanceolate, densely pubescent. Calyx 1 line in diameter in the flowering stage, densely pubescent, with 5 deltoid teeth. Petals linear-oblong, $\frac{1}{8}$ in. long. Stamens rudimentary in the specimens seen. Ovary ovoid, with a style as long as itself and a 3-lobed stigma.

Nile Land. Banks of a rocky burn in Madi, *Col. Grant!*

2. **E. guineensis,** *Baker.* A climbing shrub, glabrous in all its parts. Leaves petioled, not crowded on the branchlets; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; blade obovate, 2–3 in. long, 1–$1\frac{3}{4}$ in. broad, obtuse, entire, cuneate at the base, moderately firm in texture, green and glabrous on both sides, with copious black dots, the main veins fine and not raised. Flowers in abundant nearly sessile dense narrow oblong simple racemes under

1 in. long from branchlets that bear undeveloped leaves at the tips only; pedicels as long as the flowers, slender, glabrous, spreading or ascending; bracts minute, oblong-lanceolate. Flower-calyx under a line in diameter, campanulate, glabrous; teeth deltoid. Petals $\frac{1}{12}$ in. long, oblong, with copious dots. Stamens distinctly longer than the petals; anthers minute, round-oblong, $\frac{1}{6}$ the length of the subulate glabrous filaments. Fruit not seen.

Upper Guinea. Banks of the Bagroo River, *Mann!*

3. **E. abyssinica,** *Baker.* A climbing shrub, glabrous in all its parts. Leaves petioled, not crowded on the branchlets; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; blade obovate-oblong, 3–4 in. long, 1–1½ in. broad above the middle, obtuse or subacute, entire, rather rounded at the base, moderately firm in texture, green and glabrous on both sides, with copious minute black dots, the main veins little raised. Flowers in copious oblong racemes 1–1½ in. long, which are sessile on the branchlets below the upper leafy part; pedicels glabrous, $\frac{1}{6}$–$\frac{1}{5}$ in., ascending or spreading; bracts deltoid, very minute. Flower-calyx campanulate, $\frac{1}{12}$ in. diameter; teeth deltoid, longer than the tube. Petals oblong, $\frac{1}{8}$ in. long, copiously black-dotted. Stamens as long as the petals; anthers minute, oblong, $\frac{1}{4}$–$\frac{1}{5}$ as long as the subulate filaments. Fruit globose, glabrous, $\frac{1}{5}$ in. diameter, tipped with the slender subulate style, which is $\frac{1}{12}$ in. long, with a minute capitate stigma.

Nile Land. Abyssinia, *Schimper!*

ORDER LXXX. SAPOTACEÆ. (By J. G. Baker.)

Flowers regular, hermaphrodite. Calyx persistent, with a short tube and 5–10 segments, which are either imbricated irregularly or even in number and arranged in two distinct rows, those of the outer row being valvate in bud, and those of the inner row not so firm in texture. Corolla deciduous, equal in length to the calyx or a little longer, infundibuliform, campanulate or rarely rotate, the segments equal in number to those of the calyx or 2–3 times as many, if three times as many arranged in two distinct rows, entire or in *Imbricaria*, lacerated from the top. Stamens in all the tropical African species equal in number to the calyx-segments, inserted at or near the throat of the tube, usually alternating with petaloid staminodes; filaments short or moderately long, free; anthers ovate or lanceolate, 2-celled, dehiscing longitudinally. Ovary many-celled, with axile placentation, and one ovule in each cell. Fruit indehiscent, with a pulpy or dry coriaceous pericarp, often by abortion 1-seeded. Seed terete or compressed, exalbuminous or albuminous, the cotyledons usually thickened and fleshy.—Erect trees or shrubs, with milky juice, exstipulate or stipulate petioled entire coriaceous or subcoriaceous alternate leaves, and copious small flowers in umbels from the sides or tips of the unarmed branchlets, the pedicels, calyx and often the branchlets and

under surface of the leaves more or less densely coated with brown or whitish silky tomentum.

An order of about 300 species, widely spread almost exclusively through the tropical zone of both hemispheres.

Calyx-segments usually 5, not arranged in two distinct rows.
- Staminodes none . . . . . 1. CHRYSOPHYLLUM.
- Staminodes alternate with the stamens . . . . . 2. SIDEROXYLON.

Calyx-segments 6 or 8, rarely 10, arranged in two distinct rows.
- Corolla-segments equal in number to the calyx-segments . 3. BUTYROSPERMUM.
- Corolla-segments three times the number of the calyx-segments.
  - Corolla-segments entire . . . . . 4. MIMUSOPS.
  - Corolla-segments lacerated . . . . . 5. IMBRICARIA.

1. **CHRYSOPHYLLUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 653.

Calyx campanulate, usually deeply 5- rarely 6–7-partite, the obtuse segments broadly imbricate, not arranged in two distinct rows. Corolla campanulate, little longer than the calyx; segments as many as those of the calyx, entire, longer than the tube. Stamens as many as the corolla-segments and inserted opposite to them at the throat of the tube; filaments short; anthers usually extrorse; staminodes 0. Ovary villose, usually 5-celled; ovule medial or basal; style short, entire. Berry fleshy or coriaceous, ovoid or globose. Seeds one or few, if one globose, if more than one compressed; testa coriaceous, opaque or shining; albumen present; cotyledons foliaceous or thickened.—Erect trees or shrubs with milky juice, exstipulate coriaceous shortly-petioled entire leaves with mostly prominent parallel main veins and copious small flowers in dense clusters from the axils of the leaves or thickened leafless nodes.

A genus of about 60 species, mainly Tropical American. It is feebly represented in Tropical Asia, and reaches also Australia, the Sandwich Islands, and two species the Cape.

Anthers large; filaments very short.
- Main veins little raised . . . . . 1. *C. magalismontanum.*
- Main veins very prominent . . . . . 2. *C.? alnifolium.*

Anthers minute; filaments comparatively long.
- Leaves small (2–3 in. long) . . . . . 3. *C. prunifolium.*
- Leaves large (½–1 ft. long).
  - Leaves naked beneath . . . . . 4. *C. subnudum.*
  - Leaves clothed with pale ferruginous or whitish tomentum beneath . . . . . 5. *C. albidum.*
  - Leaves clothed with bright ferruginous tomentum beneath . . . . . 6. *C. africanum.*

1. **C. magalismontanum,** *Sonder in Linnæa,* xxiii. 72. Branchlets stout and rugose, coated only at the top with thin ferruginous tomentum. Leaves short-petioled, oblanceolate-oblong, reaching 5–6 in. long, 1½–2 in. broad above the middle, emarginate with a mucro at the tip, deltoid at the base, rigidly coriaceous, glossy on the face, thinly coated with adpressed drab silky tomentum beneath, the fine close slightly ascending veins connected by a distinct irregular

arch a little within the margin. Flowers in copious crowded clusters on very short ferruginous silky pedicels. Calyx campanulate, under $\frac{1}{8}$ in. long; segments broad oblong, obtuse, much imbricated, clothed with thin ferruginous silky tomentum. Corolla little longer than the calyx, with a short tube and oblong segments. Anthers lanceolate, nearly as long as the corolla-segments, much longer than the deltoid filament. Ovary densely silky; style short.

South Central. Highlands of the Batoka country. Also Cape, *Dr. Kirk!*

2. **C.? alnifolium,** *Baker.* A tree 50–60 ft. high, with slender strict purplish-brown terete branchlets, clothed only at the top with loose ferruginous tomentum. Leaves short-petioled, obovate, reaching a length of 6–8 in., and a breadth of $3\frac{1}{2}$–$4\frac{1}{2}$ in. above the middle, obtuse or emarginate at the tip, regularly deltoid in the lower third, less coriaceous in texture than in any of our other species, naked except a little tomentum on the ribs of the under surface, with are in 10–12 pairs, erecto-patent and very prominently raised and connected by distinctly raised cross-bars. Flowers seen in the bud stage only, when they form dense clusters sessile in the axils of the leaves. Calyx with a very short tube and 5 oblong segments densely coated with loose ferruginous tomentum. Corolla campanulate, with a short tube and oblong segments. Anthers oblong, shorter than the corolla-segments in this early stage, and filaments very short. Ovary globose, densely hairy; style very short.

Upper Guinea. In the Niger country at Onitsha, *Barter!*

This is the Tropical African plant mentioned as a doubtful *Lucuma* by Bentham in Gen. Plant. ii. 654.

3. **C. prunifolium,** *Baker.* A tree 30 ft. high, the short slender nodular branches clothed at the tip with adpressed dark ferruginous silky tomentum. Leaves oblong, distinctly petioled, reaching a length of 2–3 in., and a breadth of $1\frac{1}{2}$–$1\frac{3}{4}$ in. above the middle, shortly obtusely cuspidate, deltoid at the base, rigidly subcoriaceous, green and naked above, persistently clothed with thin silky bright ferruginous tomentum beneath, with 10–12 pairs of very much raised erecto-patent main veins which reach the margin. Flowers in copious clusters in the axils of the leaves and on the nodes of the leafless lower part of the branchlets, seen in the bud stage only; pedicels very short. Calyx minute, with a very short tube and 5 much imbricated roundish obtuse segments, clothed with ferruginous pubescence. Corolla-segments oblong. Anthers minute. Ovary densely silky; style short.

Upper Guinea. Fernando Po, *Mann!*

4. **C. subnudum,** *Baker.* A tree, 30 ft. high, with slender branchlets, only very thinly coated with ferruginous tomentum at the tip. Leaves distinctly petioled ($\frac{1}{2}$–$\frac{3}{4}$ in.), oblanceolate-oblong, reaching a length of 5–6 in., and a breadth of 2 in. above the middle, acute, deltoid at the base, rigidly coriaceous, glossy above, opaque and naked beneath, with 8–10 pairs of arcuate ascending strongly raised main veins. Flowers in copious clusters in the axils of the

leaves and below them, on slender ferruginous pedicels about $\frac{1}{12}$ in. long. Calyx globose, $\frac{1}{12}$ in. long, nearly naked, with a very short tube and nearly round much imbricated obtuse coriaceous segments. Corolla campanulate, scarcely longer than the calyx, with 5 broad oblong obtuse ciliated segments longer than the tube. Stamens inserted low down in the corolla-tube, shorter than the segments; anthers small, ovate, acute, extrorse, about as long as the glabrous filament. Ovary ovoid, densely pilose; style short.

Upper Guinea. Banks of the River Muni, 1° N. lat. *Mann!*

5. **C. albidum,** *G. Don; A. DC. Prodr.* viii. 162. A tree, 30-60 ft. high, with branchlets thinly coated with pale ferruginous or whitish tomentum. Leaves distinctly petioled, oblanceolate-oblong, reaching a length of 6–10 in., and a breadth of 2–3 in. above the middle, acute, regularly deltoid in the lowest quarter, rigidly coriaceous, bright green above, thinly coated with persistent pale ferruginous or whitish tomentum beneath, with 9–14 pairs of prominent parallel arcuate-ascending main veins. Flowers in copious clusters from the axils of the leaves and below them on ferruginous pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. long. Calyx under $\frac{1}{8}$ in. long, with a very short tube and broadly oblong much imbricated ferruginous coriaceous segments. Corolla half as long again as the calyx; segments oblong, as long as the tube. Stamens shorter than the corolla-segments, oblong, obtuse, extrorse; anthers half as long as the flat glabrous filaments. Ovary silky; style glabrous, as long as the ovary. Drupe coriaceous, glabrous, 5-celled, $1\frac{1}{2}$ in. diam. Seed very like a bean, oblong, compressed, an inch long, with a pale brown glossy testa and hilum $\frac{1}{2}$ in. long.

Upper Guinea. Island of St. Thomas, *G. Don!* Princes Island, *Mann!*

6. **C. africanum,** *A. DC. Prodr.* viii. 163 ?. A tree, 60 ft. high, with branchlets thinly coated with bright ferruginous tomentum. Leaves distinctly petioled, obovate-oblong, reaching 6–10 in. long, 3–4 in. broad above the middle, obtuse or cuspidate, deltoid or slightly rounded at the base, rigidly coriaceous, bright green above, persistently bright ferruginous beneath, with 16–20 pairs of parallel erecto-patent much raised veins. Flowers in crowded umbels from the axils of the leaves and below them on the branchlets on pedicels longer than themselves. Calyx $\frac{1}{8}$ in. long, cleft nearly to the base; segments oblong, densely coated like the pedicels with their ferruginous tomentum. Corolla campanulate, half as long again as the calyx; segments oblong, obtuse, about as long as the tube. Stamens shorter than the corolla-segments; anthers minute, oblong, obtuse, shorter than the flattened filament. Ovary silky; style short, entire; stigma capitate. —*C. macrophyllum*, G. Don. in Trans. Hort. Soc. v. 458 ?

Upper Guinea. Fernando Po, *Vogel! Mann!*

This is the *C. africanum* of Bentham in the Niger Flora, p. 441. Whether it be identical with the plant of G. Don and A. De Candolle, from Sierra Leone, there is no means of positively ascertaining. Don's description is very vague, and no authenticated specimens seem to be extant. The impression of Mr. J. Smith, A. L. S., who

was Curator of Kew Gardens at the time of its publication, is that Don had mainly in view a garden plant of uncertain origin.

DOUBTFUL SPECIES.

C. OBOVATUM, *G. Don*; *A. DC. Prodr.* viii. 163. Branchlets nearly naked. Petiole above an inch long; blade obovate-oblong, 4–6 in. long, acutely cuspidate, deltoid at the base, rigidly coriaceous, green and naked above, pale and naked beneath, the main veins fine and not raised. Flowers and fruit both unknown, Sierra Leone, *G. Don. Vogel!* Closely resembles, so far as the material goes, the Cape *C. natalense*, Sonder.

Branches stout, thinly coated towards the tip with whitish silky tomentum. Leaves distinctly petioled, oblanceolate-oblong, 5–6 in. long, $1\frac{3}{4}$–2 in. broad, emarginate at the tip, deltoid at the base, rigidly coriaceous, naked above, thinly clothed beneath with persistent whitish silky tomentum, the numerous little-raised veins not joined at the tip by an intramarginal arch. Flowers in copious clusters, seen in very young bud only, distinctly pedicelled, the minute globose bud-calyx densely coated with adpressed light ferruginous silky tomentum. Madi woods, *Col. Grant!* In habit and leaf this closely approximates to *C. magalismontanum*.

Achras sericea, Thonn. and Schum. Pl. Guin. 179 (*Sapota sericea*, A. DC. Prodr. viii. 176), from Upper Guinea, of which the flowers are unknown, of which the leaves are said to be lanceolate, reaching a length of a foot or a foot and a half, glossy on the upper and argenteo-sericeous on the lower surface, and the petioles and branchlets pubescent, may perhaps also belong to this genus.

2. SIDEROXYLON, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 655.

Calyx funnel-shaped or rotate, deeply 5- rarely 6–7-partite, the segments obtuse or subacute, imbricate, but not arranged in two distinct rows. Corolla little longer than the calyx; segments as many as those of the calyx, entire, longer than the tube. Stamens as many as the corolla-segments and inserted opposite to them at the throat of the tube; filaments subulate; anthers oblong or ovoid, usually extrorse; staminodes as many as the stamens and alternate with them, linear or linear-subulate, entire, small or as long as the filaments. Ovary globose, 5-celled; style subulate. Berry fleshy or coriaceous, ovoid or globose. Seed usually by abortion solitary; testa glossy; albumen fleshy; cotyledons foliaceous or thickened.—Erect trees or shrubs, with the habit and inflorescence of *Chrysophyllum*, but the leaves glabrous in all the Tropical African species and in some of stipulate.

A genus of about 60 species, spread round the world within the tropics and reaching also New Zealand, Madeira and the Cape (one species each).

Calyx and corolla funnel-shaped, with a distinct campanulate tube.
- Pedicels very short.
  - Leaves small, exstipulate . . . . . 1. *S. diospyroides.*
  - Leaves large, stipulate . . . . . 2. *S. brevipes.*
- Pedicels as long as the flowers.
  - Staminodes very minute . . . . . 3. *S. longistylum.*
  - Staminodes as long as the stamens . . . . . 4. *S. dulcificum.*

Calyx and corolla rotate, with a very short tube and spreading segments.
- Leaves exstipulate, obtuse or shortly cuspidate . . . 5. *S. densiflorum.*
- Leaves stipulate, acute . . . . . 6. *S. revolutum.*

1. **S. diospyroides,** *Baker.* Branchlets stiff and moderately stout, glabrous. Leaves distinctly petioled, exstipulate, obovate-cuneate, 2–3 in. long, 1–1½ in. broad above the middle, broadly rounded at the apex, narrowed regularly from the middle to the base, rigidly coriaceous, glabrous on both sides, with slender arching immersed main veins. Flowers minute, in abundant nearly sessile clusters in the axils of the leaves and below them; pedicels very short. Calyx campanulate, $\frac{1}{16}$ in. long; tube very short; segments oblong-lanceolate, permanently erect, slightly imbricated in the expanded flower, thinly coated with ferruginous tomentum. Corolla little longer than the calyx, glabrous; segments glabrous, broad oblong, obtuse, longer than the campanulate tube. Stamens as long as the corolla-segments; anthers small, ovate, acute, extrorse; filaments glabrous, subulate, rather longer than the anther; staminodes lanceolate, petaloid, entire, nearly as long as the corolla-segments. Ovary glabrous; style short, reaching to the top of the calyx.

Mozamb. Distr. Zanguebar, *Dr. Kirk!*

2. **S. brevipes**, *Baker.* A large tree with branchlets coated at the top with thin brown tomentum. Leaves short-petioled, stipulate; stipules coriaceous, subulate, $\frac{1}{4}$–$\frac{1}{2}$ in. long, deciduous; blade ovate-oblong, reaching a length of 5–8 in., and a breadth of 2½–3 in., acute, cuneate at the base, rigidly coriaceous, bright glossy green above, opaque and quite glabrous beneath, with 8–10 pairs of raised arching main veins. Flowers in copious crowded clusters placed mainly on the branches below the leaves; pedicels very short, stout. Calyx campanulate, $\frac{1}{8}$ in. long, thinly coated with pale brown tomentum; segments oblong, obtuse, twice as long as the tube, much imbricated, permanently erect. Corolla glabrous, half as long again as the calyx; segments oblanceolate-spathulate, longer than the tube, with a space between each when standing erect. Stamens reaching to the top of the corolla-segments; anthers oblong-lanceolate, moderately large, extrorse, rather shorter than the subulate glabrous filaments; staminodia minute, lanceolate, petaloid. Ovary ovoid, 5-celled, densely ferrugineo-pubescent. Style persistent, $\frac{1}{8}$ in. long.

Mozamb. Distr. Zanzibar, Zanguebar and at the North end of Lake Nyassa, *Dr. Kirk!*

3. **S. longistylum,** *Baker.* Branchlets slender, nearly naked. Leaves short-petioled, stipulate; stipules coriaceous, subulate, $\frac{3}{8}$–$\frac{1}{2}$ in. long, sub-persistent; blade obovate-oblong, reaching a length of 6–7 in., and a breadth of 2–2½ in. above the middle, narrowed gradually from the middle to the base, rigidly coriaceous, glabrous on both sides, with 8–10 pairs of little raised arching main veins. Flowers in copious clusters from the leafless part of the branchlets, on pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. long, coated with thin brown tomentum. Calyx campanulate, $\frac{1}{8}$ in. long, coated with similar thin adpressed tomentum, the 5 oblong-lanceolate erect teeth twice as long as the tube. Corolla-tube campanulate; lobes not seen. Stamens inserted a little below the top of the

corolla-tube, alternate with 5 minute lanceolate staminodes inserted in the same level. Ovary silky ovoid; style $\frac{1}{6}$ in. long, moderately stout, naked, sulcate at the stigmatose tip.

Upper Guinea. Senegambia, *Heudelot!* and a plant seen in fruit only with an ellipsoid glabrous drupe an inch long, with a thin pericarp and single large seed from Liberia, *Carder!* and a closely allied plant, seen in bud only, from Congo, *Prof. C. Smith!*

4. **S. dulcificum,** *A. DC. Prodr.* viii. 183. A shrub 6 ft. high, with slender strict glabrous brownish branchlets. Leaves shortly petioled, exstipulate, obovate-cuneate, reaching a length of 4–6 in., obtuse, subcoriaceous, glabrous. Flowers few in a cluster, on cernuous ferrugineo-pilose pedicels $\frac{1}{6}$ in. long. Calyx ferrugineo-tomentose, with 5 oblong obtuse segments. Corolla whitish, little longer than the calyx, deeply 5-fid. Stamens 5; filaments very short; anthers oblong, not exserted from the corolla; staminodes setaceous, as long as the stamens. Ovary subglobose; style reaching to the top of the corolla. Fruit the size of a gooseberry, glabrous, succulent, 1-seeded. Seed the same shape as the fruit, with a fragile brown glossy pericarp—*Bumelia dulcifica*, Thonn & Schum. Pl. Guin. 130.

Upper Guinea. Aguapim, *Thonning.*

5. **S. densiflorum,** *Baker.* A tree 30 ft. high, with moderately stout terete branchlets, thinly coated with brownish pubescence at the top. Leaves distinctly petioled, exstipulate; petiole $\frac{3}{4}$–1 in. long; blade obovate-cuneate, reaching a length of nearly a foot, and a breadth of 4–5 in. above the middle, obtuse or shortly cuspidate, narrowed gradually from the middle to the base, subcoriaceous, glabrous on both sides, with 16–20 pairs of distinctly-raised arching main veins. Flowers forming a dense continuous mass on the branchlets both in the axils of the leaves and below them, on slender stiff nearly glabrous pedicels $\frac{1}{6}$–$\frac{1}{4}$ in. long. Calyx $\frac{1}{16}$ in. long, thinly matted with brown tomentum; tube very short; segments spreading, lanceolate. Corolla twice as long as the calyx; tube very short; segments oblong-lanceolate, reflexing. Filaments subulate, glabrous, as long as the corolla-segments; anther ovoid-sagittate, very small, $\frac{1}{5}$–$\frac{1}{6}$ as long as the filament; staminodes linear, as long as the corolla-segments. Ovary globose, densely brown-silky, 5-celled; style slender, glabrous, $\frac{1}{16}$ in. long.

Upper Guinea. Island of St. Thomas, *Mann!*

6. **S. revolutum,** *Baker.* A tree 30 ft. high, with slender terete naked branchlets. Leaves distinctly petioled, stipulate; stipules rigid, linear-subulate, $\frac{1}{4}$–$\frac{3}{8}$ in. long; petiole $\frac{1}{2}$–1 in. long; blade oblanceolate-oblong, reaching a length of 6–8 in., and a breadth of $2\frac{1}{2}$–$2\frac{3}{4}$ in. above the middle, acute, cuneate at the base, subcoriaceous, glabrous on both sides, with 10–12 pairs of arching distinctly-raised main veins. Flowers very like those of *S. densiflorum*, but fewer and less dense. Pedicels slender, glabrous, stiff, reaching $\frac{1}{2}$–$\frac{3}{4}$ in. Calyx green, $\frac{1}{16}$ in. long, with a very short tube and spreading lanceolate segments. Corolla whitish, $\frac{1}{12}$ in. long, with a very short tube and reflexing oblong-lanceolate

segments. Filaments subulate, as long as the corolla segments. Anthers minute, ovoid; staminodes linear-subulate, as long as the filaments. Ovary globose, densely pilose; style slender, $\frac{1}{8}$ in. long, glabrous in the upper half.

Upper Guinea. Fernando Po, *Mann!*

3. **BUTYROSPERMUM**, Kotschy; Benth. et Hook. f. Gen. Pl. ii. p. 661.

Calyx campanulate, with a short tube; segments in two distinct rows, usually 8, sometimes 10. Corolla campanulate, as long as the calyx, with the same number of segments, which are entire, oblong and much imbricated. Stamens inserted opposite the segments of the corolla at their base; filaments subulate, glabrous; anthers oblong-lanceolate; staminodes one between each filament, large, oblong, petaloid, fimbriate. Ovary globose, silky, 8–10-celled; style long, subulate. Berry ellipsoid, with a thin firm pericarp. Seed usually by abortion solitary, exalbuminous, with very thick amygdaloid cotyledons and a short radicle.—Erect trees, with copious milky juice, stipulate petioled entire coriaceous leaves usually crowded at the end of the branchlets and flowers in dense umbels from the end of the branchlets, with the leaves.

Endemic, including one certain and one doubtful species.

Leaf 6–9 in. long, with prominent veins . . . . . 1. *B. Parkii.*
Leaf 2–3 in. long, with slender veins . . . . . 2. *B.? Kirkii!*

1. **B. Parkii,** *Kotschy in Pl. Knobl.* t. 2. A tree reaching a height of 30–40 ft., with a trunk 5–6 ft. in diameter branching like an oak, and yielding copious milky juice, which coagulates into a kind of caoutchouc. Leaves usually crowded at the tips of stout rugose glabrous branchlets, petioled, stipulate; petiole 2–3 in. long, glabrescent, pubescent at first; stipules lanceolate, subpersistent, about $\frac{1}{2}$ in. long, silky on the back; blade oblanceolate-oblong, 6–9 in. long, 3–4 in. broad, broadly cuneate or rounded at the base, subcoriaceous, glabrous when mature on the upper surface, thinly pubescent beneath, furnished with 20–25 pairs of prominent erecto-patent main veins. Flowers in dense umbels from the axils of the leaves at the end of the branchlets; pedicels $\frac{1}{2}$–1 in. or more long, thinly clothed when young with ferruginous tomentum. Calyx campanulate, coriaceous, with a short tube and usually 8 oblong-lanceolate segments, the outer 4 especially densely coated with ferruginous tomentum. Corolla as long as the calyx, with a short tube and oblong glabrous imbricated segments. Stamens as long as the corolla-segments; anthers oblong-lanceolate, $\frac{1}{8}$ in. long, half as long as the subulate glabrous filaments. Staminodes oblong-cuspidate, shorter than the stamens. Ovary globose, silky; style slender, variable in length, sometimes protruded from the corolla, sometimes included. Fruit ellipsoid, $1\frac{1}{2}$–2 in. long, with a thin pericarp and usually a single seed, with very thick cotyledons.—Pl. Tinn. 20 t. 8 B. *Bassia Parkii*, G. Don; A. DC. Prodr. viii. 199;

Oliv. in Trans. Linn. Soc. xxix. 104, t. 73. *Butyrospermum niloticum*, Kotschy Pl. Knobl. t. 1.

Upper Guinea. Kingdom of Bambara, where it was discovered by Mungo Park. In the Niger country at Nupe, Jeba, &c., *Barter!* Abbeokuta, *Dr. Irving!*

Nile Land. White Nile, *Binder;* Gondokoro, *Knoblecher;* Djur, Kosanga and the Niamniam country, *Heuglin;* Madi, *Col. Grant!*

2. **B.? Kirkii,** *Baker.* A low tree, with short glabrous terete ultimate branches. Leaves crowded at the end of the branches with very short petioles and very minute linear stipules; blade obovate-cuneate, 2–3 in. long, obtuse or subcuneate, narrowed gradually from the middle to the base, glabrous on both sides, rigidly coriaceous, with the erecto-patent main veins of the under surface not at all prominent. Flowers seen in young bud only, arranged in dense umbels at the end of the branchlets, on erecto–patent pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long, densely coated with ferruginous tomentum. Calyx coriaceous, densely clothed when young with ferruginous tomentum, with 8 lanceolate acute segments in two distinct rows. Corolla with a short tube and 8 oblong segments. Anthers lanceolate. Staminodes oblong, entire. Fruit round-oblong, glabrous, an inch long, with a coriaceous pericarp and one exalbuminous seed which has very thick cotyledons filling it up.

Mozamb. Distr. Mombasa, at an elevation of 300 ft., *Dr. Kirk!*

4. **MIMUSOPS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 661.

Corolla with a short tube and either 6 or 8 segments, arranged in two distinct rows, those of the outer row firmer in texture and valvate in bud. Corolla with a short tube and 3 times as many segments as the calyx, 12 or 16 in one outer row, and the other 6 or 8 in an inner row, opposite two segments of the outer row and the stamens. Stamens 6 or 8, inserted at the throat of the corolla-tube, about as long as the segments; anthers lanceolate; filaments short, subulate; staminodes petaloid, alternate with the stamens, inserted at the same level. Ovary hairy, globose; style subulate, entire, long or short. Berry globose or oblong, with a crustaceous epicarp. Seed often solitary, albuminous; cotyledons moderately thick.—Erect trees or shrubs, with milky juice, exstipulate short-petioled coriaceous or subcoriaceous usually glabrous leaves and copious small flowers in simple lateral umbels.

A genus of about 30 species, spread through the Tropics of both hemispheres and three species extending to the Cape.

Parts of the flower in sixes.
- Flowers $\frac{1}{12}$–$\frac{1}{8}$ in. long.
  - Staminodes acute, entire.
    - Veins fine immersed . . . . . 1. *M. cuneifolia.*
    - Veins many, distinctly raised . . . . . 2. *M. multinervis.*
  - Staminodes truncate toothed . . . . . 3. *M. Mochisia.*
- Flowers $\frac{1}{6}$ in. long . . . . . 4. *M. lacera.*

Parts of the flower in eights.
- Flowers $\frac{1}{4}$ in. long.
  - Style not protruded beyond the calyx . . . . . 5. *M. Schimperi.*

Style distinctly protruded beyond the calyx.
Leaves subcoriaceous, long petioled . . . . . 6. *M. Kirkii.*
Leaves coriaceous, short petioled . . . . . 7. *M. fruticosa.*
Flowers 4½–5 lines long . . . . . 8. *M. Kummel.*

1. **M. cuneifolia,** *Baker.* Branchlets slender, nearly naked. Leaves short-petioled, exstipulate; petiole ¼—½ in. long; blade obovate-cuneate, 2–2½ in. long, 1–1¼ in. broad above the middle, obtuse or slightly emarginate at the tip, narrowed gradually from the middle to the base, rigidly subcoriaceous, glabrous on both sides, with fine immersed veins. Flowers in umbels from the axils of the leaves and below them, on slightly ferruginous pedicels ¼—⅜ in. long, those of the lower umbels cernuous, of the upper erecto-patent. Calyx coriaceous, ⅛ in. long, thinly coated externally with brown tomentum, with a short campanulate tube and 6 deltoid reflexing segments. Corolla seen in the bud stage only; tube short; segments of the outer row 12, linear, of the inner 6, oblong, all glabrous. Anthers lanceolate, longer than the short filaments, alternating with 6 linear acute entire staminodes. Pistil seen only in a rudimentary state.

Lower Guinea. Congo, *Prof. C. Smith!*

2. **M. multinervis,** *Baker.* A tree 40 ft. high, with the exstipulate petioled leaves crowded towards the end of the naked slender branchlets. Petiole ¼—¾ in. long; blade oblanceolate-oblong, 3–4 in. long, 1½–2 in. broad above the middle, obtuse and sometimes faintly emarginate at the point, rigidly coriaceous, glabrous on both sides, with 20–30 pairs of slightly raised parallel erecto-patent veins. Flowers in dense umbels in the axils of the leaves and below them on slender pedicels ¼—⅓ in. long, thinly coated with adpressed brown tomentum. Calyx subcoriaceous, ⅛ in. long, thinly tomentose, with a very short tube and 6 oblong-deltoid reflexing segments. Corolla with a very short tube and 18 linear glabrous segments as long as the calyx. Anthers oblong, about as long as the filaments, alternating with 6 lanceolate entire staminodes. Ovary globose; style slender, reaching to the top of the corolla segments.

Upper Guinea. In the Niger country at Nupe, *Barter!*

3. **M. Mochisia,** *Baker.* A bush or low tree with the habit of *Prunus spinosa*, with the leaves with the umbels in their axils mostly in dense lateral or terminal fascicles. Branchlets not at all tomentose. Petiole very short; blade oblanceolate-oblong, 1–2 in. long, ⅝—¾ in. broad above the middle, obtuse, often distinctly emarginate at the point, cuneate at the base, subcoriaceous or coriaceous, glabrous on both sides, with fine immersed veins. Flowers in dense umbels from the same nodes as the leaves on slender glabrous pedicels ¼—½ in. long. Calyx 1½ in. long, with scarcely any tube and 6 oblong reflexing segments. Corolla with a short tube and 18 reflexing linear segments as long as those of the calyx. Stamens shorter than the corolla, with a small ovate-lanceolate anther as long as the glabrous subulate filament, alternating with 6 minute toothed petaloid cuneate truncate glabrous

staminodes. Fruit yellow, glabrous, the size of a bullace. Seeds 3–4 maturing, ellipsoid, laterally compressed, with a crustaceous pale brown testa and thick amygdaloid cotyledons.

South Central. Highlands of Batoka country, *Dr. Kirk!*
Mozamb. Distr. In Zambesi-land at Senna and Tette, *Dr. Kirk!*

4. **M. lacera,** *Baker.* A tree 40–50 ft. high, yielding a substance like gutta-percha, with terete slender naked branchlets. Leaves petioled, exstipulate; petiole $\frac{1}{2}$–1 in.; blade obovate-oblong, 4–6 in. long, 2–$3\frac{1}{2}$ in. broad above the middle, obtuse, cuneate at the base, rigidly coriaceous, glabrous on both sides, with numerous fine little-raised erecto-patent main veins. Flowers in dense umbels from the axils of the leaves and below them on slender straight glabrous pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long. Calyx green, coriaceous, campanulate, subglabrous, $\frac{1}{6}$ in. long; tube very short; outer segments oblong-lanceolate, inner oblong. Corolla whitish, as long as the calyx, with 18 entire linear segments. Stamens 6, rather shorter than the corolla-segments, alternating with 6 lacerated lanceolate staminodes as long as themselves; anthers oblong-lanceolate, about as long as the filaments. Ovary globose; style $\frac{1}{6}$ in. long. Fruit glabrous, ellipsoid, an inch long.

Upper Guinea. Nupe, *Barter!* Banks of the River Nun, *Mann!*

5. **M. Schimperi,** *Hochst. in Schimp. Pl. Abyss.* n. 697. A large tree, with slender glabrous branchlets. Leaves petioled, exstipulate; petiole 1–$1\frac{1}{4}$ in.; blade oblong, 3–5 in. long, $1\frac{1}{2}$–2 in. broad at the middle, obtuse or subacute, deltoid at the base, subcoriaceous, glabrous on both sides, with fine main veins. Flowers in umbels from the axils of the leaves on nearly glabrous spreading or ascending pedicels about $\frac{1}{2}$ in. long. Calyx coriaceous, $\frac{1}{4}$ in. long, thinly coated with dull brown ferruginous tomentum, with a very short tube and 8 acute segments, the outer row lanceolate, the inner linear. Corolla with a very short tube and 24 linear segments, equal in length to those of the calyx. Stamens 8, included, the extrorse lanceolate anthers larger than the subulate glabrous filaments. Staminodes 8, linear, nearly as long as the corolla-segments, tomentose on the back. Ovary globose, pilose; style not protruded beyond the corolla. Fruit ellipsoid, glabrous, 1-seeded, 1–$1\frac{1}{4}$ in. long.—A. Rich. Fl. Abyss. ii. 22.

Nile Land. Mountains of Abyssinia, *Schimper!*

6. **M. Kirkii,** *Baker.* A handsome spreading tree with slender nearly glabrous branchlets. Leaves petioled, exstipulate; petiole $\frac{1}{2}$–1 in.; blade obovate-oblong, 2–4 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, obtuse, cuneate at the base, subcoriaceous, glabrous on both sides, with fine main veins. Flowers few together in umbels from the leaf-bearing nodes, on arching pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long, coated with thin brown tomentum. Calyx coriaceous, $\frac{1}{4}$ in. long, with a very short tube and 8 segments, the 4 outer ones lanceolate and coated with brown tomentum, the 4 inner ones linear and coated with drab tomentum. Corolla as long as the calyx, with a short tube and 24 linear segments. Stamens 8, nearly as long as the corolla-segments; anthers lanceolate, longer

than the filaments; staminodes linear, tomentose on the back, about as long as the stamens. Ovary globose; style slender, glabrous, much exserted from the corolla. Fruit globose, glabrous, an inch long, eatable.

Mozamb. Distr. Lower Shire Valley and at the junction of the Shire and Zambesi, *Dr. Kirk! Dr. Meller!* and a variety with broader leaves and longer pedicels at Rovuma, *Dr. Kirk!*

7. **M. fruticosa,** *Bojer; A. DC. Prodr.* viii. 203. A low tree, with slender branchlets thinly coated at the top with ferruginous tomentum. Leaves petioled, exstipulate; petiole very short ($\frac{1}{4}$–$\frac{1}{3}$ in.); blade obovate-oblong, $1\frac{1}{2}$–2 in. long, 1–$1\frac{1}{4}$ in. broad, obtuse or obtusely cuspidate, rigidly coriaceous, glabrous on both sides, very glossy above, with fine immersed main veins. Flowers in copious umbels from the side and tip of the branchlets on spreading pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long coated with thin brown tomentum. Calyx coriaceous, campanulate, $\frac{1}{4}$ in. long, with a very short tube and 8 acute segments, the 4 outer lanceolate, coated with brown tomentum, the 4 inner ones linear, thinly coated with drab tomentum. Corolla with a short tube and 24 linear segments as long as those of the calyx. Stamens 8, included; anthers oblong-lanceolate; staminodes linear, acute, entire, silky on the back. Ovary globose, silky; style slender, glabrous, distinctly protruded from the corolla. Fruit small, globose.

Mozamb. Distr. Islands of Pemba and Mombassa, *Bojer!* Zanguebar, *Dr. Kirk!*

8. **M. Kummel,** *Hochst.; A. DC. Prodr.* viii. 203. A large tree, with slender nearly glabrous branchlets. Leaves distinctly petioled, exstipulate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; blade oblong, 2–3 in. long, 1–$1\frac{1}{2}$ in. broad at the middle, obtuse or subacute, cuneate at the base, glabrous on both sides, with fine main veins. Flowers few together from the axils of the leaves, on arching pedicels about an inch long, thinly coated with brown tomentum. Calyx coriaceous, $\frac{3}{8}$ in. long, with a very short tube and 8 segments, the 4 outer ones lanceolate, the 4 inner linear. Corolla with a short tube and 24 linear segments as long as those of the calyx. Stamens 8, rather shorter than the corolla segments; anther lanceolate, equalling the glabrous subulate filament; staminodes 8, minute, linear, acute, silky on the back. Ovary globose, 8-celled; style glabrous, $\frac{1}{2}$ in. long, slender, protruded from the corolla. Fruit ellipsoid, glabrous, an inch long. Seed solitary, ellipsoid, compressed, with a pale brown glossy testa.—A. Rich. Fl. Abyss. ii. 22.

Nile Land. Mountains of Abyssinia, *Bruce! Schimper! Quartin Dillon and Petit! Beccari.* Madi, *Capt. Grant!*

Upper Guinea. Jeba on the Kworra, *Barter!* (not seen in flower. Petiole longer, leaf larger and fruit more globose than in the Abyssinian plant).

5. IMBRICARIA, Juss.; Benth. et Hook. f. Gen. Pl. ii. p. 661.

Calyx coriaceous with a short tube and 8 segments, arranged in two distinct rows, those of the outer row firmer in texture and valvate

in bud. Corolla with a short tube and 3 times as many segments as the calyx, 16 in the outer row much imbricated and cut down nearly to the base into narrow linear divisions and 8 in an inner row, which are entire. Stamens 8, placed at the throat of the corolla-tube opposite the segments of the inner row, alternating with linear staminodes; anther lanceolate; filament short, subulate. Ovary hairy, 8-celled; style subulate. Fruit globose or ellipsoid, with a thin pericarp. Seed usually solitary by abortion, albuminous, with moderately thick cotyledons.—Trees with the habit, leaves and inflorescence of *Mimusops*, from which they differ only by the lacerated corolla-segments of the outer row.

Species 4 or 5, the others exclusively Mascarene.

1. **I. fragrans,** *Baker.* A low spreading tree, with slender branches, densely coated with ferruginous tomentum. Leaves exstipulate, distinctly petioled; petiole $\frac{3}{4}$–1 in., densely tomentose; blade obovate-oblong, 3–4 in. long, 18–21 lines broad above the middle, obtuse or obscurely cuspidate, narrowed gradually from the middle to the base, subcoriaceous, glabrous, pubescent when mature only on the midrib beneath, the veins fine and inconspicuous. Flowers fragrant, placed few together in umbels from the tip and side of the branchlets, on densely ferruginous-tomentose cernuous or ascending pedicels above an inch long. Calyx $\frac{1}{2}$ in. long, coriaceous, densely ferruginous, with a short tube and 8 acute segments, those of the outer row lanceolate, of the inner row linear and coated with thinner paler tomentum. Corolla cream-coloured, the 16 segments of the outer row shorter than the calyx, cut down nearly to the base into 4-5 narrow linear divisions; the 8 segments of the inner row as long as the calyx, ligulate and entire. Stamens shorter than the inner segments; anthers lanceolate, $\frac{1}{8}$ in. long, exceeding the glabrous filaments. Staminodes linear, entire, tomentose on the back. Ovary globose, densely silky; style $\frac{1}{3}$ in. long, glabrous, protruded beyond the calyx.

Upper Guinea. In the Niger country at Yomba, *Barter!*

Order LXXXI. EBENACEÆ. (By W. P. Hiern.)

Flowers dioecious, rarely hermaphrodite or polygamous, regular. Calyx inferior, gamosepalous, small in flower, often accrescent in fruit, 3–6-lobed or subentire; æstivation various. Corolla gamopetalous, exceeding the calyx, tubular urceolate campanulate or rotate, 3–6-lobed; lobes usually entire, obtuse and spreading, contorted sinistrorsely in the bud (as seen from inside). Stamens 6–∞, usually 3 or 4 times the number of parts in the corolla, inserted at the base (in one species in the middle) of the corolla; in female flowers abortive, few or 0; anthers narrow linear or lanceolate; filaments usually short, connate at the base in pairs or otherwise, or free. Disk 0. Ovary solitary, free, 2–10- (not 5-, 7-, nor 9-) celled, sessile, in male flowers rudimentary;

style or style-branches usually half as numerous as the ovules; stigmas emarginate or punctiform; ovules 4–10, solitary or in pairs (collateral) in the cells of the ovary, pendulous, anatropous. Fruit coriaceous or fleshy, indehiscent or rarely splitting in a valvate manner. Seeds 1–8, pendulous, globose or segments of a sphere; testa thin; albumen cartilaginous or bony, copious, uniform or ruminated; embryo $\frac{1}{3}$–$\frac{3}{4}$ of the length of the seed; cotyledons foliaceous, ovate; radicle terete, superior.—Shrubs or trees, not spinous, usually with hard wood, often black in the centre. Leaves alternate or rarely subopposite opposite or ternate, simple, quite entire, shortly petiolate, exstipulate, evergreen or deciduous. Inflorescence axillary or lateral, short; flowers usually small, white flesh-coloured reddish or yellowish, solitary or several together. Fruit often edible.

A Natural Order of 264 species, chiefly tropical and subtropical, most abundant in the East Indies; moreover about 60 fossil species have been published, a few of which seem to be correctly referred to this Order; 2 fossil species have occurred in the Libyan Desert, about 25° N. Lat., the geological age being Upper Cretaceous.

Flowers hermaphrodite. Stamens in one row	1. ROYENA.
Flowers dicœcious or rarely polygamous. Stamens usually in 2 or more rows.	
Calyx not accrescent. Staminodes usually absent from the female flower. Inflorescence racemose, rarely paniculate	2. EUCLEA.
Calyx often accrescent. Staminodes often present in the female flower. Inflorescence cymose, not racemose, sometimes 1-flowered.	
Ovary 3- or 6-celled. Flowers usually trimerous .	3. MABA.
Ovary 4- or 8-celled. Flowers usually 4–5-merous .	4. DIOSPYROS.

1. ROYENA, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 663.

Calyx deeply lobed (in our species), often accrescent in fruit; lobes 5 or rarely 4, more or less pubescent or silky. Corolla campanulate or urceolate, shortly exceeding the calyx, 5-cleft; lobes obtuse, reflexed. Stamens 10, uniseriate, inserted at the base of the corolla-tube; filaments short, glabrous; anthers lanceolate-linear, somewhat hairy. Ovary conical, pubescent; cells twice as many as the 2–4 styles or style-branches; stigmas punctiform. Fruit globose ovoid or oblong, coriaceous, indehiscent or splitting. Seeds as in the Order; albumen uniform.—Evergreen shrubs or small trees with alternate leaves, axillary peduncles and small hermaphrodite flowers.

A genus of 13 species, all confined to the Cape Flora, except the following:—

Fruiting calyx patent or reflexed	1. *R. pallens.*
Fruiting calyx appressed	2. *R. cistoides.*

1. **R. pallens,** *Thunb. Prodr. Pl. Cap.*, pars prior, p. 80 (1794).

A shrub or small tree, ranging from a few inches to 15 ft. in height; bark reddish brown; branches silky pubescent or glabrescent, pallid. Leaves obovate-elliptical, often narrowly so, usually obtuse at the apex, narrowed towards the base into the petiole, coriaceous, silky especially beneath or glabrescent, $\frac{1}{2}$–2 by $\frac{1}{6}$–$\frac{3}{4}$ in.; petiole $\frac{1}{20}$–$\frac{1}{3}$ in.

Flowers $\frac{1}{4}$–$\frac{2}{5}$ in. long, white or yellowish, pentamerous or rarely tetramerous; peduncles solitary, 1- (rarely 2-) flowered, longer than the flowers, $\frac{2}{5}$–$\frac{4}{5}$in. long, arching, bearing 2–3 narrow bracts about or above the middle. Calyx partite; lobes ovate or lanceolate, acute, hairy, accrescent, in fruit spreading or reflexed. Stamens half as long as the flower; anthers hairy. Ovary hairy; style 3–5-cleft, hairy. Fruit subglobose or ovoid, pubescent or rarely glabrate, $\frac{1}{2}$–1 in. diam., sometimes bursting in a valvate manner.—Hiern, Monogr. Eben. p. 85, cum syn.

Lower Guinea. Huilla, in woods and thickets, *Welwitsch!*
Mozamb. Distr. Seshike, 3,000 ft. alt., *Kirk!* Manganja hills, *Meller!*
Occurs also, widely distributed, south of the Tropic.

2. **R. cistoides,** *Welw. ex Hiern, Monogr. Eben.* p. 87 (1873). A low bush of 1–1$\frac{1}{2}$ ft., with hard strong wood; branches terete, at length glabrate; branchlets softly pubescent, erect; fruiting branches arching-ascending. Leaves narrowly obovate, obtuse or mucronulate at the apex, narrowed to an obtuse base, subcoriaceous, hoary silky on both sides, rather veiny beneath, shortly petiolate, $\frac{1}{2}$–1$\frac{1}{4}$ by $\frac{1}{4}$–$\frac{3}{5}$ in.; margins reflexed. Flowers unknown. Fruiting peduncles solitary, $\frac{1}{3}$–$\frac{5}{8}$ in. long, spreading, hairy, 1-fruited. Fruiting calyx deeply 5-lobed, hairy on both sides, appressed to the fruit, $\frac{1}{4}$–$\frac{3}{8}$ in. long; lobes elliptical, obtusely pointed. Fruit subglobose, puberulous, glossy, hard, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., often splitting from the apex; colour golden. Seeds 3–5, $\frac{1}{4}$ in. long.

Lower Guinea. Angola, Pungo Andongo, 3,500 ft. alt., *Welwitsch!*

2. EUCLEA, Linn.; Benth. et Hook. f. Gen. Pl. ii. p. 664.

Calyx campanulate cup-shaped or subrotate, 4–5-lobed, not accrescent; lobes usually ovate or deltoid. Corolla campanulate or hemispherical, shortly exceeding the calyx, 4–5-lobed; lobes ovate or rounded. Stamens 10–22 (in our species), or in the female plant 0 or represented by 2–4 glabrous staminodes, free or in pairs, inserted at the base of the corolla-tube or around the rudimentary ovary. Ovary abortive in the male plant, in the female 4- or rarely 2-celled; styles 2, usually glabrous; ovules 4 in all. Fruit subglobose, indehiscent, usually 1-celled and 1-seeded. Seed globose, usually marked outside with 3 longitudinal depressed lines; albumen uniform or ruminated.—Evergreen shrubs or small trees with opposite subopposite alternate or rarely ternate leaves, axillary racemes or panicles and small dioecious or rarely polygamous flowers.

A genus of 19 species, all confined to the Cape Flora, except the following:—

Ovary hairy.
  Corolla shortly lobed at the apex . . . . . 1. *E. pseudebenus.*
  Corolla cleft or deeply lobed.
    Fruiting calyx-tube receiving the base of the fruit.
      Male flowers racemose, 5–9 together . . . . . 2. *E. lanceolata.*
      Male flowers panicled or many together.
        Leaves opposite, glabrous and subglaucous above . 3. *E. divinorum.*

Leaves alternate, pubescent or not glaucous . . .	4. *E. multiflora.*
Fruiting calyx-tube consolidated	5. *E. fructuosa.*
Ovary glabrous.	
Leaves often terete. Ovary 2-celled.	6. *E. bilocularis.*
Leaves subopposite. Ovary 4-celled.	7. *E. Kellau.*

1. **E. pseudebenus,** *E. Mey. Cat. Pl. Exsicc. Afr. Austr. Drèg.* p. 7 (1837). A more or less pubescent leafy shrub, ranging up to 8 ft. in height. Leaves alternate, crowded, linear, apiculate or mucronate, narrowed at the base, coriaceous, pubescent or glabrescent, erect or spreading, 1–2¼ by $\frac{1}{10}$–$\frac{1}{4}$ in.; petiole $\frac{1}{20}$–$\frac{1}{7}$ in. Male cymes racemose, hairy, 3–7-flowered, erect or erect-patent, $\frac{1}{5}$–$\frac{2}{5}$ in. long; pedicels slender, $\frac{1}{10}$–$\frac{1}{5}$ in. long; flowers dicœcious, white, $\frac{1}{10}$–$\frac{1}{7}$ in. long, hoary-pubescent, usually pentamerous; calyx cleft, lobes deltoid; corolla shortly lobed at the apex; stamens 12–22; anthers glabrous or sparingly hairy; filaments more or less connate below, inserted around the base of the rudimentary ovary. Female flowers solitary or 2–3 together in small cymes; staminodes 0; ovary 4-celled, pubescent. Fruit globose, $\frac{1}{5}$ in. diam., 1-celled, 1-seeded, glaucous, bluish, fleshy, edible. Seed marked with 3 depressed lines; albumen not or scarcely ruminated.—*E. angustifolia,* Benth. in Hook. Niger Fl. p. 441.

Lower Guinea. Mossamedes, native name "Emboto" as also of the next species, *Welwitsch!* "South of the Line," *Curror!*

South Central. 23° S. Lat., *Chapman and Baines!*

Occurs also in the Western districts of the Cape Flora, where it is known by the name of Orange River Ebony.

2. **E. lanceolata,** *E. Mey. Cat. Pl. Exsicc. Afr. Austr. Drèg.* p. 7 (1837). A shrub or small tree, ranging from 1 to 12 ft. in height or more; branches terete; young shoots angular. Leaves alternate or more usually opposite, lanceolate or narrowly elliptical, obtuse or subacute at the apex, narrowed at the base, coriaceous, 1–3 by ¼–1$\frac{1}{6}$ in., more or less wavy; petioles ranging up to $\frac{1}{5}$ in. Flowers racemose, dicœcious, white or tinged with red; bracts small or foliaceous. Male racemes usually 5–9-flowered, $\frac{1}{2}$–$\frac{3}{4}$ in. long; flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long, tetramerous or rarely pentamerous; calyx widely campanulate, short, cleft, lobes deltoid; corolla campanulate, deeply cleft, lobes oval, somewhat pubescent outside; stamens usually 16, rarely fewer, inserted mostly in pairs at the base of the corolla-tube; ovary rudimentary, hirsute; styles 2, glabrous. Female racemes $\frac{1}{4}$–$\frac{1}{3}$ in. long, 3–7-flowered; pedicels very short; staminodes 0; ovary subglobose, densely hirsute, 4-celled; styles 2, glabrous. Fruit globose, $\frac{1}{4}$ in. diam. or rather larger, reddish or dark purple, edible, pubescent or glabrate, 1-celled. Seed solitary; testa somewhat intruded into the albumen. —Hiern, Monogr. Eben. p. 97, cum syn.

Our specimens belong to two forms, as follows:—

α. Leaves glabrous and shining, the young ones lepidote.

Lower Guinea. Benguella, Mossamedes (native name "Emboto") and Huilla, *Welwitsch!*

β. Leaves and shoots pubescent.

Lower Guinea. Huilla, *Welwitsch!*

The species extends over several districts of the Cape Flora.

3. **E. divinorum,** *Hiern, Monogr. Eben.* p. 99. A shrub, nearly glabrous and somewhat glaucous; branches terete. Leaves opposite or subopposite, elliptical, narrowed more or less from the middle towards each end especially towards the base, obtuse, coriaceous, glaucescent above, reddish and somewhat farinaceous beneath, 1½–2¼ by ½–¾ in.; veins inconspicuous; margins undulated; petiole about ⅓ in. long. Male flowers in crowded racemes or panicles, 10 or more together, 4–5-merous, hemispherical; cymes not more than ¾ by ⅓ in., usually erect; pedicels $\frac{1}{10}$ in. long, spreading, longer than the small caducous bracts. Calyx $\frac{1}{20}$ in. long; lobes short. Corolla deeply lobed; lobes rounded. Stamens 16; anthers oblong, hairy, longer than the glabrous filaments. Ovary rudimentary, represented by a bunch of hairs. Female plant unknown.

South Central. Victoria Falls, *Kirk!*
Occurs also at Delagoa Bay, south of the Tropic, and in Basuta Country.

4. **E. multiflora,** *Hiern, Monogr. Eben.* p. 100, t. 3. A more or less pubescent bush or arborescent shrub, ranging up to 10 ft. in height; pubescence whitish, becoming ferruginous in the dry state; branches terete below, usually angular towards the apex. Leaves alternate or subopposite, elliptical or oblong, obtuse or slightly pointed, wedge-shaped at the base, coriaceous, inconspicuously veiny above, 1–3 by ½–1¼ in.; margins recurving, sometimes rather wavy; petiole about ¼ in. long. Flowers dicœcious or polygamous, 4–5-merous, paniculate and many together in the male plant; panicles 1–2 in. long. Calyx campanulate, cleft, hairy; lobes ovate or deltoid. Corolla deeply lobed, lobes oval, usually hairy along the middle line outside. Stamens 16–20 in the male or hermaphrodite plant, inserted in pairs at the base of the corolla or around the ovary, none in the female plant. Ovary globose, hairy and 4-celled in the female plant, abortive in the male. Styles 2, glabrous or nearly so. Fruit globose, ferruginous-hairy or nearly glabrate, ¼–⅓ in. diam., 1-celled. Seed solitary.—*Diospyros* (sp.), Salt, Voyage to Abyssinia, etc., p. 14 (1814).

Lower Guinea. Pungo Andongo and Huilla, *Welwitsch!*
Mozamb. Distr. Sofala, *Salt!*
Occurs also in several districts of the Cape Flora.

5. **E. fructuosa,** *Hiern, Monogr. Eben.* p. 101. A small or arborescent shrub, with softly pubescent tawny terete branches. Leaves alternate or subopposite, obovate-oblong, wedge-shaped at the base, coriaceous, quickly glabrescent and nitescent, 1½–4½ by ¾–1½ in., delicately reticulated; margins reflexed; petiole $\frac{3}{10}$–$\frac{2}{5}$ in. long, pubescent. Male plant unknown. Fruiting racemes or panicles ranging up to 1 in. long, with about 20 fruits, pubescent; pedicels short, thickened upwards to the articulation with the calyx. Calyx 5-lobed; lobes deltoid, acute, small; tube consolidated in fruit. Corolla sometimes marcescent, apparently 4–5-cleft; lobes ovate. Fruits tawny-pubescent, ¼ in. diam., 1-celled. Seed solitary; albumen uniform.

Mozamb. Distr. Between Tette and the sea-coast, *Kirk!* Luame mouth of th Zambesi, *Kirk!* Dar Salam, *Kirk!*

6. **E. bilocularis,** *Hiern, Monogr. Eben.* p. 102. Glabrous. Branches sometimes whorled 3 together. Leaves alternate opposite or whorled 3 together, obovate, rounded at the apex, wedge-shaped at the base, coriaceous, somewhat wavy, 2–3 by $\frac{4}{5}$–$1\frac{2}{5}$ in.; veins inconspicuously raised on both surfaces, dark green above, redder beneath; petiole $\frac{1}{10}$ in. long. Racemes of female flowers dense, short (in bud), about 9-flowered; flowers tetramerous. Calyx cup-shaped, shortly toothed. Corolla 4-cleft. Staminodes 0. Ovary 2-celled, glabrous; cells 2-ovuled.

Mozamb. Distr. *Zanzibar, Kirk!*

A male plant, with 16–18 stamens, from Madagascar, may belong to this species.

7. **E. Kellau,** *Hochst. in Hb. Schimp. Abyss.* sect. ii. n. 1078. A glabrous shrub or small tree; branches subopposite, straight. Leaves subopposite, obovate or oblanceolate, rounded at the apex, wedge-shaped at the base, subcoriaceous, glossy above, paler beneath, flat or wavy, 1–2 by $\frac{1}{4}$–1 in.; veins delicate; petiole $\frac{1}{10}$–$\frac{1}{8}$ in. Flowers 4–5-merous, racemose; bracts lanceolate, at the base of the pedicels, small. Racemes 9–11-flowered; the male ones lax, $\frac{3}{4}$–1 in. long, the female $\frac{2}{5}$–$\frac{1}{2}$ in. Calyx-lobes deltoid, apiculate or acuminate. Corolla deeply cleft. Stamens 12, in female plants 0. Ovary in female plant conical, glabrous, 4-celled; cells 1-ovuled: styles 2. Fruits globose, $\frac{1}{4}$ in. diam., edible.—Hochst. in Flora, 1843, p. 83. *Myrsine Kellau*, Hochst. in Hb. Schimp. Abyss. sect i. n. 159. *Kellaua Schimperi*, Alph. DC. in Ann. Sc. Nat. sér. ii. vol xvi. p. 96 (1841) name only, et vol. xviii. p. 209 (1842).

Nile Land. Abyssinia, *Schimper! Quartin Dillon and Petit!*

The Abyssinian name of the fruit is "*Kellau.*"

The species is the same as, or closely allied to, the "Nakus" of Arabia Felix, mentioned by Forskål, Fl. Ægypt.-Arab. p. 197 (1775); see Hiern in Trimen, Journ. Bot., 1877, p. 97.

3. MABA, J. R. et G. Forst.; Benth. et Hook. f. Gen. Pl. ii. p. 664.

Calyx campanulate in flower, usually trifid, occasionally 4–5-merous, in fruit sometimes accrescent to a moderate extent. Corolla campanulate or tubular, exceeding the calyx, usually 3-lobed. Stamens in male flowers 6–12 (in our species), glabrous, distinct or united by their filaments in pairs; represented in the female plants by 3–6 staminodes or altogether wanting. Ovary in the male plants rudimentary, in the female 3- or 6-celled, hairy or glabrous; style 3-lobed; ovules 6 in all, solitary in the 6-celled ovaries, two together in the 3-celled ovaries. Fruit globose or ovoid, not large, baccate or dry, indehiscent, 1–6-celled. Seeds 1–6; albumen uniform or ruminated. Fruiting calyx spreading or cup-shaped.—Shrubs or trees, usually with hard wood, with alternate leaves of moderate size, short axillary cymes, and small diœcious flowers.

A genus of 60 species, widely scattered over the tropics; only one species occurs in Natal, none in other parts of the continent of Africa except the following.

Ovary densely hairy.
(Staminodes 0.) Ovary 3-celled. Albumen of the seeds uniform.
Fruiting calyx very small, spreading . . . . . 1. *M. Mualala.*
Fruiting calyx somewhat accrescent or not very small, cup-shaped.
Male flowers 3–1 together. Leaves obtuse . . . . 2. *M. buxifolia.*
Male flowers several together. Leaves acute . . . 3. *M. lancea.*
(Staminodes 3–6). Ovary 6-celled. Albumen of the seeds ruminated . . . . . 4. *M. Mannii.*
Ovary quite glabrous.
Flowers clustered several together. Branches dark green.
Leaves lanceolate-oblong . . . . . 5. *M. abyssinica.*
Female flowers 3–1 together. Branches silvery-ashy. Leaves oval . . . . . 6. *M. quiloënsis.*

1. **M. Mualala,** *Welw. ex Hiern, Monogr. Eben.* p. 111. A glabrous evergreen tree of 15–35 ft. in the interior or scarcely more than a bush of 3–5 ft. near the sea-coast, very rarely flowering; trunk strict; wood very hard, often black in the centre; branches terete. Leaves elliptical, in most cases obtusely acuminate, slightly narrowed or nearly rounded at the base, thinly coriaceous, dark green, glossy, delicately reticulated, rather wavy, $1\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{4}{5}$–$1\frac{3}{4}$ in.; midrib depressed above; petiole $\frac{1}{12}$–$\frac{1}{5}$ in. long. Flowers unknown. Fruit solitary or two together, subsessile, globose, shining, glabrous, black-purplish, slightly veiny, $\frac{1}{3}$ in. diameter, 1-celled. Fruiting calyx very small, $\frac{1}{4}$–$\frac{1}{3}$ in. diameter, trifid, spreading, glabrate; lobes ovate, subacute. Seed solitary, globose, nearly $\frac{1}{4}$ in. diameter; albumen uniform.

Lower Guinea. Loanda (very rare) and Golungo Alto, *Welwitsch!*
Native name *Mualalâ.*

2. **M. buxifolia,** *Pers. Syn. Pl.* ii. p. 606 (1807). A much-branched shrub with terete branches; young parts more or less ferruginous pubescent or hirsute, at length glabrescent. Leaves elliptical obovate or lanceolate, obtuse at the apex, more or less wedge-shaped at the base, coriaceous or somewhat membranous, often wavy, $\frac{1}{2}$–5 by $\frac{1}{4}$–2 in.; veins inconspicuous, sometimes hairy; margin somewhat thickened or reflexed; petioles ranging up to $\frac{1}{4}$ in., sometimes hairy. Flowers 1–3 together, subsessile, pubescent, about $\frac{1}{5}$ in. long, arranged on the young branches in very short axillary cymes. Calyx $\frac{1}{10}$ in. long, campanulate, with 3 short deltoid lobes, somewhat accrescent in fruit. Corolla campanulate-oblong, shortly trifid, white; lobes elliptical. Stamens 6–12 in the male plant, none in the female, hypogynous, glabrous. Ovary hairy, rudimentary in the male plant, 3-celled in the female; cells 2-ovuled; style tridentate. Fruit globose or ellipsoidal, $\frac{1}{3}$–$\frac{2}{5}$ in. diameter, glabrate. Fruiting calyx cup-shaped, shorter than the fruit. Seed solitary; albumen uniform.—Hiern, Monogr. Eben. p. 116, cum syn. *Ferreola guineensis,* Schum. et Thonn. Beskr. Guin. Pl. p. 448. *M. guineensis* and *M. Smeathmanni,* Alph. DC. Prodr. viii. p. 241. *M. vaccinifolia,* Benth. in Hook. Niger Fl. p. 442.

Upper Guinea. Gold Coast, *Thonning;* Guinea, *Leprieur!* Sierra Leone, *Smeathman!* St. Thomas Island, *G. Don!*

Lower Guinea. Congo, *Chr. Smith!* Ambriz, *Welwitsch!*
A very variable species, occurring also in Madagascar, the East Indies, Australia and the Pacific Islands.

3. **M. lancea,** *Hiern, Monogr. Eben.* p. 118. Shrubby; young parts and inflorescence puberulous; branches straight. Leaves lanceolate-oblong, acutely acuminate at the apex, somewhat narrowed at the base, thinly and firmly subcoriaceous, opaque, nearly glabrous except the veins beneath, dark green with inconspicuous veins above, paler beneath, 3–4 by 1 in.; petiole $\frac{1}{10}$–$\frac{1}{8}$ in. long. Male flowers small, several together, crowded in very short ferruginous-hairy axillary cymes, ferruginous-hairy; bracts rounded. Calyx broadly campanulate, deeply trifid (or by exception pentamerous). Corolla pale-ferruginous silky, 3 ?-lobed, glabrous inside. Stamens 5–6 (?), hypogynous, erect; anthers subsessile, hairy towards the base, subulate. Ovary 0. Female plant unknown.

Upper Guinea. Sierra Leone, *Smeathman!*

4. **M. Mannii,** *Hiern, Monogr. Eben.* p. 129. A small tree or an arborescent shrub, glabrate; branches terete, smooth, erect-patent. Leaves oval-ovate, obtusely narrowed at the apex, somewhat narrowed at the base, thinly coriaceous, glossy, dark above, redder beneath, slightly wavy or flat, inconspicuously veined, $2\frac{1}{2}$–5 by 1–$2\frac{1}{2}$ in.; petiole $\frac{1}{10}$–$\frac{1}{5}$ in. Flowers trimerous, subsessile, $\frac{1}{4}$–$\frac{2}{5}$ in. long, in very abbreviated axillary cymes, the male ones a few together, the female ones unknown. Calyx campanulate, not quite glabrous, $\frac{1}{10}$ in. long, trifid, with round ciliolate lobes, not accrescent. Corolla white, tubular; tube exceeding the calyx; lobes 3, short, rounded. Stamens 6–9 in the male plant, linear, acute, somewhat hairy, inserted at the base of the corolla. Ovary in the male plant rudimentary, hairy. Fruit subglobose, with 5–6 obscure rounded sides, nearly 1 in. diameter, 5–6-celled, of a bright orange colour when ripe, glossy, nearly glabrate but showing remains of hairs. Fruiting calyx $\frac{1}{4}$–$\frac{1}{3}$ in. diameter, spreading, appressed to the base of the fruit, not quite glabrous. Seeds 5–6, solitary in the cells; albumen ruminated.

Upper Guinea. Niger Expedition, opposite Stirling, *Th. Vogel!* (doubtfully referred by Mr. Bentham, in Hook. Niger Fl. p. 442, to *Diospyros senegalensis*, Perr.); at Nupe, *Barter!* Bagroo River, *Mann!*

5. **M. abyssinica,** *Hiern, Monogr. Eben.* p. 132. A large shrub, glabrous except the inflorescence; shoots terete. Leaves lanceolate-oblong, obtuse and often somewhat acuminate at the apex, more or less narrowed at the base, subcoriaceous, flat, of the same colour on both surfaces, somewhat shining above, patent or erect-patent, 2–5 by $\frac{1}{2}$–$1\frac{3}{8}$ in.; midrib slightly depressed above; veins inconspicuous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. long. Flowers subsessile, clustered, axillary, mostly trimerous, sometimes 4–5-merous; bracts pubescent, small, caducous. Male flowers $\frac{1}{6}$ in. long; calyx cleft, lobes rounded, minutely ciliate; corolla widely campanulate, glabrous, lobes rounded; stamens about 14, glabrous, mostly in pairs, inserted at the base of the corolla, fila-

ments short; ovary rudimentary, glabrous. Female flowers 3–5 together, $\frac{1}{4}$–$\frac{1}{3}$ in. long, on very short puberulous pedicels; calyx $\frac{1}{6}$ in. long or after the fall of the corolla $\frac{1}{4}$ in. long, campanulate, lobes wide or cordate at the base; corolla not always isomerous with the calyx, deeply lobed, lobes spreading or recurved, oval-ovate, obtuse; staminodes 3–4, glabrous; ovary glabrous, ovoid-conical, 6-celled; ovules solitary; style tridentate; fruiting calyx lax, not accrescent. Fruit subglobose, about $\frac{1}{2}$ in. diameter, glabrous, glossy, bearing the remains of the style at the apex. Seeds 1 or few; albumen uniform.

Nile Land. Abyssinia, 5–6,000 ft. alt., *Schimper! Beccari!*

6. **M. quiloënsis,** *Hiern, Monogr. Eben.* p. 132. A glabrous shrub; branches terete, silvery-ashy; youngest shoots green. Leaves (rather young) oval, rounded at both ends or slightly cordate at the base, thin, dark-coloured on both sides in the dry state, 1–2¼ by $\frac{1}{2}$–1$\frac{1}{8}$ in.; lateral veins inconspicuous; petiole very short. Male flowers unknown. Female flowers subsessile, 3–1 together, nearly black in the dry state, apparently rather precocious. Calyx $\frac{1}{10}$ in. long, glabrous, with 3 ovate lobes which extend two-thirds down the calyx. Corolla unknown. Ovary glabrous, ovoid-conical, 6-celled; ovules solitary; style tridentate, glabrous, just exceeding the calyx.

Mozamb. Distr. Quiloa, *Kirk!*

4. **DIOSPYROS,** Dalech.; Benth. et Hook. f. Gen. Pl. ii. p. 665.

Calyx usually campanulate and 4–5-lobed, rarely 3- or 6-lobed, often accrescent in fruit. Corolla tubular or campanulate or rotate, usually 4–5-lobed; lobes usually spreading or recurved. Stamens 6–∞, usually about 16 and more or less united by their base in pairs or otherwise, inserted at the base of the corolla or hypogynous, in female flowers 0 or usually fewer than in the male and abortive; anthers linear or lanceolate; filaments usually shorter or almost obsolete. Ovary globose ovoid or conical, 4- or 8-celled, glabrous or hairy, in male flowers rudimentary; styles or style-branches 2–4; stigmas usually emarginate; ovules solitary. Fruit globose oblong or conical, coriaceous or thin-skinned, often pulpy inside and edible. Seeds 1–8, oblong or hemispherical or globose; albumen uniform or ruminated.—Trees or shrubs, with alternate shortly petiolate leaves, and usually small axillary solitary or shortly cymose flowers.

A genus of 172 species, widely scattered over the tropics and warmer parts of the world; one species occurs at Delagoa Bay, none in other parts of the continent of Africa except the following.

Albumen of the seeds ruminated.
- Leaves oblong or oval or somewhat obovate. Fruit subglobose, not polygonal nor verrucose.
  - Leaves usually oblong, glabrescent, thinly coriaceous . 1. *D. mespiliformis.*
  - Leaves usually broadly oval, somewhat tomentose or puberulous beneath, firmly coriaceous . . . . 2. *D. platyphylla.*
- Leaves ovate-oblong. Fruit roundedly 4-sided, verrucose 3. *D. verrucosa.*

Albumen of the seeds uniform.
Calyx very shortly lobed.
Leaves whitish beneath, firmly coriaceous . . . . . 4. *D. batocana.*
Leaves membranous, not whitish beneath . . . . . 5. *D. senensis.*
Calyx cleft or partite.
Fruit conical. Corolla-lobes acute.
Ovary silky. Leaves obtuse not cordate at the base 6. *D. tricolor.*
Ovary glabrous except the apex. Leaves cordate at the base . . . . . 7. *D. Barteri.*
Fruit globose. Corolla-lobes obtuse.
Flowers on recurved peduncles or in comparatively lax cymes.
Female flowers solitary. Staminodes 0 . . . . 8. *D. squarrosa.*
Flowers cymose. Staminodes 8 . . . . . 9. *D. Loureiriana.*
Flowers clustered subsessile or in very abbreviated cymes.
Stamens inserted about the middle of the corolla . 10. *D. Dendo.*
Stamens inserted at the base of the corolla or hypogynous.
Corolla tubular, shortly lobed at the apex. Stamens 9–15, unequal.
Filaments glabrous. Leaves velvety-puberulous beneath . . . . . 11. *D. Kirkii.*
Filaments pubescent. Leaves with scattered hairs beneath . . . . . 12. *D. Heudelotii.*
Corolla subrotate. Stamens 15–17, nearly equal 13. *D. Mannii.*
Corolla egg-shaped. Stamens very numerous, subequal . . . . . 14. *D. crassiflora.*

1. **D. mespiliformis,** *Hochst. in Hb. Schimp. Abyss.* sect. ii. nn. 655, 1243. A shrub or tree, 6–40 ft. high or more; wood compact, often black in the middle; branches terete, more or less patent, glabrescent; young shoots and inflorescence ferruginous-tomentose. Leaves oblong or elliptical, somewhat narrowed or rounded at each end, thinly coriaceous (the young ones softly pubescent and membranous) glabrescent or with appressed hairs beneath, rather shining, 2–6 by $\frac{2}{3}$–$2\frac{1}{2}$ in.; midrib depressed above; lateral and net-veins delicate; margins just recurved; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. Flowers white, dicecious; inflorescence axillary, short. Male flowers few or many together, ferruginous-tomentose, $\frac{1}{3}$ in. long, pentamerous or occasionally tetramerous; bracteoles lanceolate, small; calyx cleft, $\frac{1}{6}$ in. long, campanulate or campanulate-oblong, hairy on both sides, lobes ovate or lanceolate; corolla urceolate-oblong, shortly cleft, silky outside, glabrous inside, lobes spreading, pointed; stamens 10–16, often in pairs, nearly glabrous but with a narrow line of light-coloured hairs on the back of the anthers, inserted at the base of the corolla, filaments short, connective produced at the apex, pollen broadly ellipsoidal, smooth; ovary rudimentary, hairy or wanting. Female flowers solitary or 3–1 together, pentamerous or tetramerous or rarely trimerous; peduncles $\frac{1}{8}$–$\frac{3}{8}$ in. long; bracts narrow, caducous; calyx hairy on both sides, campanulate, deeply-lobed, lobes ovate acuminate with wavy margins; corolla shortly lobed, lobes pointed; staminodes 6–8, in one row, inserted at the base of the corolla, glabrous; ovary ovoid or conical, silky, terminated by 2 short hirsute bilobed styles, 4- or 8-celled and -ovuled.

Fruit subglobose, ⅔–1 in. diameter or rather larger, glabrate, often slightly wrinkled, 4–5-seeded, edible. Seeds shining, ½–⅔ in. long; albumen somewhat ruminated. Fruiting calyx somewhat or but little increased, with undulated margins, appressed to the fruit or spreading. —Alph. DC. Prodr. viii. p. 672. *D. senegalensis*, Perrottet ex Alph. DC. l.c. p. 234. *D. bicolor*, Klotzsch in Peters Mossamb. Bot. i. p. 184.

Upper Guinea. Senegambia, *Perrottet! Leprieur! Lelievre! Roger! Whitfield! Daniell!* ("Monkey Guava"); Cape Coast, *Brass!*; Niger Expedition, at Nupe, *Barter!*

Nile Land. Abyssinia, *Schimper! Ant. Petit!* Nubia, *Kotschy!* Sennaar, *Cienkowsky;* Gallabat, *Schweinfurth!* Dinka-land (native ebony) and Bongo-land (a favourite fruit), *Schweinfurth*, "Heart of Africa," English edition, vol. i. pp. 155, 221.

Lower Guinea. Golungo Alto (native name, *Musolveira*) and Bumbo, also Congo at Ambriz, *Welwitsch!*

South Central. Matabili-land, *T. Baines!*

Mozamb. Distr. Near Lupata, *Kirk!* between Tette and the coast, *Kirk!* 50 miles above Tette, *Kirk!* Senna, *Peters!*

Occurs also in Yemen, Arabia Felix; see Hiern in Trimen, Journ. Bot., 1877, p. 98.

This species is probably the plant mentioned by Perrottet, without description, under the name of *Diospyros dioica* (non Span.), Observ. Cult. Sénégal, in Annales Maritimes, Paris, 1831, p. 352.

The specimen in fruit without expanded leaves, from the island of Fernando Po, gathered by Th. Vogel, which was doubtfully referred to *D. senegalensis*, Perr., by Mr. Bentham in Hook. Niger Fl. p. 442, differs by the reflexed calyx, but I am unable to refer it to any species known to me.

2. **D. platyphylla,** *Welw. ex Hiern Monogr. Eben.* p. 266. A moderate-sized tree, loosely and tortuously branched, angular and leafy towards the extremities; young parts and inflorescence tomentose-pubescent, pale tawny or ferruginous; bark glabrate, dark or ashy. Leaves subrotund oval or somewhat obovate, rounded or obtuse at the apex, rounded or obtuse often oblique at the base, firmly coriaceous, glabrescent and rather shining above, slightly tomentose or puberulous beneath, inconspicuously reticulated, 3–6 by 1¼–3½ in.; petiole ¼–⅓ in. long, robust. Flowers monstrous in the specimens, the inflorescence consisting entirely of densely imbricated ferruginous-tomentose foliaceous scales. Fruit said to be edible.

Lower Guinea. Pungo Andongo, in woods, *Welwitsch!*

The native name is "Musolveira," the same as that of *D. mespiliformis*, Hochst., of which it may perhaps prove to be a monstrous aberrant form.

3. **D. verrucosa,** *Hiern, Monogr. Eben.* p. 167. A shrub; branches numerous, at length glabrescent, terete; young shoots densely and shortly pubescent, subferruginous. Leaves ovate-oblong, thinly coriaceous, somewhat narrowed and mucronulate at the apex, rounded at the base, nearly glabrous above except that the depressed midrib is puberulous, paler with pale appressed pubescence beneath and rufous-pubescent on the raised midrib and lateral veins, 1½–3½ by ⅚–1⅘ in.; lateral veins about 6 on each side of the midrib; petiole 1/10–⅕ in. long, rufous, densely puberulous. Male flowers unknown. Female flowers solitary, on distinct densely puberulous rather slender peduncles, axillary; bracts small, rufous-hairy, caducous, near the base of the

peduncle; fruiting peduncles stout, thickened upwards with a wide articulation at the apex, nearly $\frac{1}{5}$ in. thick, puberulous or subglabrate, $\frac{1}{3}$–$\frac{2}{5}$ in. long, patent. Fruiting calyx subtomentose-puberulous on both sides, spreading, 4-fid, $\frac{7}{20}$ in. diam., with depresso-deltoid lobes slightly recurved at the apex. Fruit oblong or globose, pulpy, roundedly 4-sided, verrucose, at length smoother, with pale ferruginous short pubescence between the raised warty prominences, bluntly umbonate at the apex, 1–1$\frac{1}{4}$ in. long by $\frac{5}{6}$–1 in. across from one side to the opposite side, 4-celled; cells 1-seeded. Seeds $\frac{2}{3}$–$\frac{3}{4}$ in. long, enclosed in a thin chartaceous envelope, transverse section a quadrant of a circle of radius $\frac{3}{10}$ in., showing several intrusions of the testa into the albumen corresponding with the depressed lines on the exterior of the seed; embryo nearly straight, nearly the length of the seed; radicle superior, much shorter than the compressed 1–3-nerved cotyledons. In one case the calyx was triangular and flat. The pulp of the fruit is eaten.

Mozamb. Distr. Prov. Zanguebar, *Kirk!* Zambesia, Rovuma River, 20 miles above the mouth, *Kirk!*

4. **D. batocana,** *Hiern, Monogr. Eben.* p. 174. A large bush, quite or nearly glabrous except the buds and inflorescence; branches dark-ashy. Leaves oval-oblong, more or less rounded at both ends, firmly coriaceous, shining above, whitish beneath, glabrous or with a few minute black setæ beneath, with reflexed margins and veins in delicate relief on both sides, 2–2$\frac{1}{2}$ by $\frac{3}{4}$–1 in.; petiole $\frac{1}{5}$–$\frac{1}{4}$ in. long, angular, wrinkled, often twisted or recurved. Male flowers clustered, several together, sessile, on fuliginous—and ferruginous-hispid nodules of the branches of the previous season; bracts at the base of the calyx. Calyx fuliginous- and ferruginous-hispid on both sides, 5-lobed at the apex. Corolla fuliginous-hispid outside, pale and glabrous inside, 5-cleft, crass, ovoid; lobes obtuse. Stamens 12–16 (?), glabrous, unequal; filaments short. Ovary represented by ferruginous hairs. Female flowers unknown.

South Central. Batoka Country, Setoka, fruit eaten, *Kirk!*

5. **D. senensis,** *Klotzsch in Peters, Mossamb. Bot.* i. p. 183. A shrub from 10 ft. to a tree of 30 ft.; branches terete, pale-ashy or reddish; young shoots yellowish-pubescent. Leaves obovate-oblong, suddenly narrowed or acuminate or occasionally rounded at the apex, wedge-shaped or nearly rounded at the base, membranous, subglabrescent and deep green above with depressed midrib, somewhat yellowish-pubescent or subglabrescent beneath, 2–7$\frac{1}{4}$ by 1–3$\frac{1}{2}$ in.; petiole hairy, $\frac{1}{10}$–$\frac{1}{2}$ in. long. Inflorescence axillary, in short 1–5-flowered cymes, yellowish-pubescent; peduncles $\frac{1}{10}$–$\frac{1}{3}$ in. long; bracts small, caducous, at the base of the very short pedicels; flowers dicecious, occasionally subhermaphrodite or polygamous, greenish-yellow, fragrant. Calyx tubular, subtruncate or with 4 short rounded lobes at the apex, $\frac{1}{4}$–$\frac{2}{5}$ in. long, hairy on both sides, somewhat accrescent. Corolla tubular, about twice the length of the calyx, 4-cleft, glabrous except a hairy line outside down the middle of each of the oblong obtuse lobes. Stamens 16, in pairs, gla-

brous, partly inserted at the base of the corolla and partly hypogynous, 0 in female flowers. Ovary glabrous ?, 8-celled, rudimentary in male flowers, occasionally 5-celled in subhermaphrodite flowers. Fruit solitary, glabrous (but hairy around the base of the style), acorn-shaped, 1 by $\frac{8}{9}$ in., half enclosed in the subtruncate shortly pubescent calyx. Albumen of the seeds uniform.

Upper Guinea. Abbeokuta, *Irving! Barter!* Niger Expedition at Eppah, *Barter!*

Mozamb. Distr. Senna, *Peters!* Zambesi and Shire, *Kirk! Meller!*

6. **D. tricolor,** *Hiern, Monogr. Eben.* p. 183, t. v. fig. 1. A much-branched shrub of 2–4 ft. high or a small tree; branches terete, ferruginous-tomentose, diverging, sometimes flexuous, procumbent. Leaves distichous, elliptical, obtuse at both ends, with few (3–5) inconspicuous lateral veins, green and glabrescent above, white-silky with the midrib and margin often ferruginous beneath, 1–3 by $\frac{2}{3}$–2 in., the young ones silvery-silky on both sides; petiole $\frac{1}{10}$–$\frac{1}{5}$ in. long, shortly and closely pubescent. Flowers clustered 4–1 together, axillary, tetramerous, dicecious, silky-pubescent, sessile. Calyx campanulate, 4-cleft; lobes ovate, acute, not or but little accrescent. Corolla tubular in the male (more dilated in the female), 3 times the length of the calyx, subcoriaceous, $\frac{1}{6}$ in. long, 4-cleft; lobes rather acute, erect. Stamens 6–8 or more, unequal; filaments pubescent below; anthers subulate, abortive in female flowers. Ovary ovoid-conical, silky, in male flowers rudimentary. Fruit solitary, ovoid-conical, acute, glabrous except near the apex, obsoletely 4-sided, 1–1$\frac{1}{4}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., 2–4-seeded. Fruiting calyx, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., spreading. Seeds $\frac{3}{5}$ in. long, enclosed in a papery envelope; albumen white, uniform.—*Noltia tricolor,* Schum. et Thonn. Beskr. Guin. Pl. p. 189.

Upper Guinea. Guinea, native name "Aumbæ," *Thonning!* Cape Coast, *Brass!* Niger Expedition, at Lagos, *Barter!*

7. **D. Barteri,** *Hiern, Monogr. Eben.* p. 187. A shrub with young shoots rufous-hispid or afterwards fuscous-hispid; older branches dark, terete, glabrate. Leaves oval-ovate, acuminate, apiculate, at the base cordate, firmly subcoriaceous, dark green and glabrous except on the depressed midrib, and with depressed veins above; paler with hispid-pilose ferruginous hairs, especially on the veins beneath, 2–3 by 1–1$\frac{1}{2}$ in.; petioles hispid, $\frac{1}{10}$–$\frac{1}{7}$ in. long. Male flowers unknown. Female flowers solitary, subsessile, axillary, with acicular rufous-hispid-pilose caducous bracts. Calyx $\frac{1}{4}$ in. long, rufous-hispid-pilose, 4–5-partite, with linear-lanceolate lobes, somewhat spreading in flower and subhorizontal not accrescent in fruit, hispid inside. Corolla conical in bud and as long as the calyx, ferruginous-hispid outside, glabrous inside, 5-fid; lobes acute. Staminodes 11, short, in one row and distinct (except 1 pair), pilose. Pistil conical; ovary glabrous except the apex, 4-celled; cells 1-ovuled; styles 2, bilobed at the apex, pilose below, as long as the young ovary. Fruit oblong-conical, 1$\frac{1}{6}$ in. long, glabrous (except the apex), shining, with remains of the styles where it is

shortly ferruginous-pubescent, 2-celled; cells 1-seeded; seeds $\frac{2}{3}$ in. long; albumen not ruminated.

Upper Guinea. Lagos, *Barter!*

8. **D. squarrosa,** *Klotzsch in Peters, Mossamb. Bot.* i. p. 184. A tree or much-branched shrub; young shoots delicately hispid, virgate; branches glabrescent, terete. Leaves elliptical or somewhat obovate, thinly coriaceous, rounded at both ends or sometimes narrowed, with scattered patent pubescence or subglabrescent subnitescent above, paler with patent pubescence rufous and denser on the midrib and lateral veins beneath, patent, delicately reticulated, $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{5}{6}$–2 in.; petiole $\frac{3}{20}$–$\frac{1}{4}$ in. long, pubescent. Male flowers unknown. Female flowers axillary, solitary, drooping, tetramerous; peduncles recurved, $\frac{1}{4}$–$\frac{1}{3}$ in. long, patently pubescent; bracts caducous, at about the middle of the peduncle, lanceolate, $\frac{3}{10}$ in. long. Calyx covered with short appressed tawny hairs on both sides, loosely hemispherical, $\frac{1}{4}$ in. long, with 4 deep oval or ovate lobes. Corolla 4-partite, openly cup-shaped or rotate, nearly glabrous, but with scattered pale appressed hairs outside along the middle of the lobes; lobes reflexed, about $\frac{1}{3}$ in. long, obtuse. Staminodes 0. Ovary glabrous, somewhat 4-sided, $\frac{1}{12}$ in. high, 8-celled, 8-ovuled; styles 4, glabrous, bifid to about the middle, not persistent. Fruit glabrous, somewhat 4-sidedly globular, about $\frac{2}{5}$ in. diam; fruiting calyx with pendent lobes, not accrescent.

Mozamb. Distr. River Zambesi at Senna (left bank) and Rivoque near Tette, January, local name "Mutshenje tuna tuna," Sechuana dialect, *Kirk!* Senna, in hedges near water-courses, *Peters!*

9. **D. Loureiriana,** *G. Don, Gen. Syst.* iv. p. 39 (1837). A shrub of 2–8 ft. or a small tree; young parts and inflorescence shortly glandular-pubescent and scattered with pilose hairs. Leaves oblong or obovate-oblong, more or less acuminate at the apex, obtuse, rounded or subcordate at the base, submembranous, weakly pubescent on the veins and ciliate on the margins when young, glabrescent, $\frac{3}{4}$–4 by $\frac{1}{3}$–$2\frac{1}{3}$ in.; petiole $\frac{1}{7}$–$\frac{3}{4}$ in. Flowers subhermaphrodite or polygamous, drooping, $\frac{1}{5}$ in. long; cymes axillary, glandular-hairy, 3–many-flowered; peduncle $\frac{1}{5}$–$\frac{1}{3}$ in. long, twice the length of the pedicels, bearing ovate cordate bracts at the apex. Calyx green, $\frac{1}{7}$ in. long, more or less accrescent; lobes 4, deltoid, $\frac{1}{10}$ in. long, valvate in æstivation. Corolla urceolate, white, deeply 4-lobed; lobes obtuse. Stamens 8, in one row, lanceolate, inserted at the base of the corolla, subsessile, pilose, abortive in female flowers. Ovary shortly tomentose or puberulous, 8-celled or abortive, globose or ovoid-conical; styles 4 or style 4-lobed. Fruit globose, 1 in. diam., puberulous or glabrate, 4-celled. Seeds 4, $\frac{1}{3}$ in. long; albumen not ruminated; embryo $\frac{1}{6}$ in. long; cotyledons narrow, rather longer than the radicle. Fruiting peduncle strong, $\frac{1}{4}$–$\frac{1}{2}$ in. long; pedicels $\frac{1}{3}$ in. long.—Hiern, Monogr. Eben. p. 194. *D. Lotus*, Lour. Fl. Cochinch. p. 226 (1790); neque Linn. nec Blanco.

There are two forms of this species, as follows:—

α. *macrocalyx*, Hiern in Trimen, Journ. Bot., 1875, p. 355. Calyx much accres-

cent; lobes in fruit foliaceous, broadly ovate, not reflexed.—*D. macrocalyx*, Klotsch in Peters, Mossamb. Bot. i. p. 182, non Alph. DC.

Mozamb. Distr. Senna, native name "Nhamodéma," the roots are used to clean and dye teeth red, *Peters! Kirk!* Rovuma River, also between Laputa and Tette, and Quiloa, *Kirk!*

β. *heterotricha*, Welw. ex Hiern in Trimen, *l. c.* Calyx moderately accrescent; lobes in fruit subfoliaceous, ovate-oblong, at length usually reflexed. Pilose hairs more abundantly scattered than in α. *macrocalyx*. Inflorescence shorter.

Lower Guinea. Congo, *Chr. Smith! Burton!* (native name *M'biebi*); Angola, Golungo Alto, fruit edible, *Welwitsch!*

A specimen from Sierra Leone, gathered by Afzelius, may possibly belong to the second form.

10. **D. Dendo,** *Welw. ex Hiern, Monogr. Eben.* p. 195, t. x. An evergreen leafy tree of 25–40 ft., valuable as timber; wood very black and hard in the middle; trunk 1–2 ft. diameter; branches terete, smooth, dark-ashy, glabrescent; young parts shortly and closely tawny-pubescent. Leaves elliptic-oblong, obtusely acuminate, somewhat or scarcely wedge-shaped at the base, thinly coriaceous or submembranous, rather shining, darker above, glabrescent or the midrib and sometimes also the 4–5 pairs of slender lateral veins puberulous on both sides, 2–5½ by 1–2⅔ in.; midrib depressed on the upper surface, slender; tertiary veins transverse, very slender; petiole ⅛–¼ in. long, puberulous. Inflorescence axillary or slightly supra-axillary, abbreviated, shortly and closely tawny-pubescent; flowers dicœcious, 5–6-merous, clustered, several together, ⅕–¼ in. long; pedicels very short. Calyx campanulate, somewhat turbinate, shortly and closely tawny-pubescent on both sides, cleft or in the female more deeply lobed, accrescent; lobes ovate. Corolla glabrous or nearly so; tube short, campanulate-funnel-shaped; lobes ⅛ in. long, oval, obtuse, reflexed in the male, erect or spreading in the female. Stamens 20 or 24, exserted, inserted in two rows at the open mouth of the corolla-tube, equal or subequal, 0 in the female plant; anthers linear, erect, hairy, sessile or subsessile; pollen globular, smooth. Ovary glabrous, obtusely conical, 4-celled, bilobed at the apex, in male flowers rudimentary; style 0; stigmas 2, compressed, with thin margins; ovules solitary. Fruit subglobose, glabrous, shining, black-purple, ⅔ in. diameter. Fruiting calyx rather spreading, 1–1½ in. diameter; lobes ovate or lanceolate, obtuse, about ½ in. long, rather plicate at the base. Seeds 2, subhemispherical, ¼ in. diameter; albumen uniform; embryo ⅐ in. long, nearly straight; radicle ½ in. long, bent near the upper end.—*Diospyros* (sp.), Welw. Syn. Explic. p. 10 (1862); native name, "Dendo"; compare also Welw. Apont. p. 552 (1859).

Lower Guinea. Angola, Golungo Alto, in dense mountainous woods, *Welwitsch!*

11. **D. Kirkii,** *Hiern, Monogr. Eben.* p. 199. A tree with terete ashy glabrescent branches; young shoots ferruginous, tomentose-puberulous. Leaves oval or oval-oblong, rounded at both ends, coriaceous, above velvety-puberulous rather shining with delicate slightly raised veins, below velvety-pubescent tawny with raised rufous midrib

INDEX OF GENERA AND SPECIES.

The Synonyms and Species incidentally mentioned are printed in Italics.

	Page
Achras sericea, S. & T.	501
Achyrocline	339
adoënsis, Sch. Bip.	341
batocana, *O. & H.*	339
glumacea, *O. & H.*	340
Hochstetteri, *Sch. Bip.*	339
luzuloides, *Vatke*	340
Schimperi, *Sch. Bip.*	340
sclerochlæna, *Sch. Bip.*	341
Steetzii, Vatke	339
Acmella caulirhiza, Del.	384
Adelostigma	320
athrixioides, *St.*	321
senegalensis, *Bth.*	320
Adenostemma	299
caffrum, DC.	300
Dregei, DC.	300
mauritianum, DC.	300
natalense, DC.	300
Perrottetii, DC.	300
Schimperi, Sch. Bip.	300
viscosum, *F.*	299
Adina	39
microcephala, *Hiern*	40
Agathæa abyssinica, Hochst.	306
dentata, A. Rich.	306
Agathisanthemum Bojeri, Kl.	54
globosum, Kl.	54
Petersii, Kl.	54
Agauria	483
salicifolia, *Hk. f.*	483
Ageratum	300
conyzoides, *L.*	300
Agrocharis gracilis, Hk. f.	27
melanantha, Hochst.	27
Alepidea	7
amatymbica, *E. & S.*	7
ciliaris, Lar.	7
longifolia, E. Mey.	7
peduncularis, *Steud.*	7
Allagopappus chrysopsioides, Sch. Bip.	364
Alvardia arborescens, Fenzl.	23
Amajoua africana, Spr.	182
Amaralia	112
bignoniæflora, *Welw.*	112
Ambassa Hochstetteri, St.	287
Amberboa abyssinica, A. Rich.	438
Hochstetteri, Buch.	438
sinaica, DC.	439
Ambrosia	370
maritima, *L.*	370
maritima, L.	371
senegalensis, *DC.*	371
Ammi	11
majus, *L.*	12
pauciradiatum, Hochst.	12
Ampherephis senegalensis, Less.	298
Anagallis	490
arvensis, *L.*	490
Anaxeton septentrionalis, Vatke	344
Ancylanthos	158
Bainesii, *Hiern*	160
cinerascens, *Welw.*	159
cistifolius, *Welw.*	159
fulgidus, *Welw.*	159
rubiginosus, *Desf.*	158
Ancylanthus, DC.	158
Anethum graveolens, L.	19, 20
segetum, L.	19
Anisopappus	369
africanus, *O. & H.*	369
chinensis, *H. & A.*	369
Anisoramphus hypochæroides, Hk. f.	450
Annesorhiza abyssinica, A. Br.	11
Anthemiopsis macrophylla, Boj.	376
Anthemis	396
abyssinica, Gay	396
Cotula, *L.*	396
pygmæa, *Sch. Bip.*	396
tigrensis, Gay	396
Anthospermum	229
asperuloides, *Hk. f.*	230
hirsutum, A. Rich.	229
muricatum, *Hochst.*	229
pachyrrhizum, *Hiern*	229
Anthriscus	16
africana, *Hk. f.*	16
sylvestris, *Hoffm.*	16
Antithrixia	356
abyssinica, *Bth. & Hk. f.*	356
abyssinica, Vatke	357
angustifolia, *O. & H.*	356
Apium	11
graveolens, L.	11
nodiflorum, *Rchb. f.*	11
Aralia abyssinica, Hochst.	29
farinosa, Delil.	28
pinnata, Hochst.	28
Araliaceæ	27
Araschcoolia acaulis, Sch. Bip.	368
Arctotis	427
pygmæa, *A. Rich.*	427
Ardisia	495
bracteata, *Baker*	495
cymosa, *Baker*	495
Ardisiandra	488
sibthorpioides, *Hk. f.*	489

Page
Argostemma . . . 44
pumilum, *Benn.* . . 44
verticillatum, Well. 45
Arnica piloselloides, L. 445
Artemisia 400
abyssinica, *Sch. Bip.* 400
Afra, Jacq. . . . 400
Schimperi, Sch. Bip. 400
Ascaricida adoënsis, St. 291
Buchingeri, St. . . 290
Kotschyana, St. . . 289
mossambiquensis, St. 292
Richardi, St. . . 291
Aspilia 378
abyssinica, *O. & H.* 379
angustifolia, *O. & H.* 380
helianthoides, *O. & H.* 381
Kotschyi, *B. & Hk. f.* 381
latifolia, *O. & H.* . 379
linearifolia, *O. & H.* 380
multiflora, *O. & H.* 378
rudis, *O. & H.* . . 380
Schimperi, *O. & H.* 379
Smithiana, *O. & H.* 380
wedeliæformis, Vatke 461
Aster abyssinicus, Hochst. . . . 306
Asteriscus graveolens, DC. 370
Asterolinon adoense, Kunze 489
Astropanax abyssinicum, Seem. 29
Baikiei, Seem. . . 30
Barteri, Seem. . . 30
elatum, Seem. . . 30
Manni, Seem. . . 31
Athrixia 355
rosmarinifolia, *O. & H.* 355
Aulacocalyx 129
jasminiflora, *Hk. f.* 129

Baccharis ægyptiaca, Forsk. 329
Dioscoridis, L. . . 329
ovalis, Pers. . . . 328
ovata, Sieb. . . . 328
senegalensis, Pers. . 284
Baconia corymbosa, DC. 176
montana, Hk. f. . 177
Barkhausia adenothrix, A. Rich. . . . 450
carbonaria, A. Rich. 449
Schimperi, Sch. Bip. 449
Schultzii, Hochst. . 449
tenerrima, A. Rich. 449

Page
Bassia Parkii, G. Don 504
Belonophora . . . 129
coffeoides, *Hk. f.* . 129
Benzonia, Schum. . . 246
corymbosa, Schum. 247
Bergkias, Sonn. . . 101
Berkheya 428
Zeyheri, *O. & H.* . 429
gorterioides, *O. & H.* 429
Spekeana, *Oliv.* . . 429
Berthelotea lanceolata, DC. 329 . . . 329
Bertiera 82
æthiopica, *Hiern* . 83
africana, *A. Rich.* . 84
bracteolata, *Hiern* . 84
breviflora, *Hiern* . 85
coccinea, G. Don . 70
laxa, *Bth.* . . . 85
macrocarpa, *Bth.* . 84
montana, *Hiern* . . 83
Pomatium, Bth. . 84
subsessilis, *Hiern* . 83
Bidens 392
abortiva, S. & T. . 393
abyssinica, Sch. Bip. 393
bipinnata, *L.* . . 393
Buchingeri, Sch. Bip. 394
Kotschyi, Sch. Bip. 393
laciniata, Sch. Bip. 394
leucantha, W. . . 393
lineariloba, *Oliv.* . 394
pilosa, *L.* 392
quadriseta, *Hochst.* 393
Schimperi, *Sch. Bip.* 393
Blæria 484
condensata, Hochst. 484
spicata, *Hochst.* . . 484
Blainvillea 374
Gayana, *Cass.* . . 375
Prieureana, *DC.* . 375
rhomboidea, *Cass.* . 375
Blepharispermum . . 335
petiolare, DC. 335, 336
spinulosum, *O. & H.* 335
zanguebaricum, *O. & H.* . . . 336
Blumea 322
abyssinica, *Sch. Bip.* 323
alata, DC. . . . 326
aurita, *DC.* . 315, 322
axillaris, DC. . . 323
baccharoides, Sch. Bip. 329
Bovei, Vatke . . . 323
crassifolia, A. Rich. 325
dregeanoides, Sch. Bip. 323
guineensis, DC. . . 315

Page
guineensis, DC. . . 322
lacera, *DC.* . . . 322
oloptera, DC. . . 326
Perrottetiana, DC. . 323
Petitiana, A. Rich. . 326
phagnaloides, A. Rich. . . . 339
pterodonta, DC. . . 324
purpurascens, A. Rich. . . . 324
runcinata, Thoms. . 323
senegalensis, DC. . 315
solidaginoides, DC. . 323
thyrsoidea, Sch. Bip. 323
tomentosa, A. Rich. 326
Wightiana, DC. . . 323
Bigelovia verticillata, Spr. 240
Bojeria glabra, Kl. . 461
Boriania megacephala, Sch. Bip. . . . 327
Borreria hebecarpa, Hochst. . . . 237
Kohautiana, C. & S. 240
neglecta, A. Rich. . 237
radiata, DC. . . . 238
ramisparsa, DC. . 238
tenuissima, Schw. . 234
Bothriocline . . . 265
Schimperi, *O. & H.* 266
Bracheilema paniculatum, Br. . . . 284
Brachycome 305
mossambicensis, *O. & H.* . . . 305
Brachyderæa carbonaria, Sch. Bip. . 449
Rüppellii, Sch. Bip. 450
Schultzii, Sch. Bip. 449
tenerrima, Sch. Bip. 449
xylorrhiza, Sch. Bip. 448
Brachyramphus . . 451
goræensis, DC. . . 452
lactucoides, T. And. 455
Schimperi, Sch. Bip. 454
Brocchia cinerea, Vis. 398
Kotschyi, Sch. Bip. 398
Bunburya capensis, Meisn. 123
Bupthalmum graveolens, Forsk. . . 370
pratense, Vahl . . 305
scandens, S. & T. . 382
Bumelia dulcifica, S. & T. 503
Butyrospermum . . 504
? Kirkii, *Baker* . . 505
Parkii, *Kotschy* . . 504

Page

Cacalia abyssinica, Br. 407
abyssinica, Walp. . 414
pumila, Boj. . . . 406
grandiflora, Wall. . 408
gracilis, Boj. . . . 406
humifusa, Boj. . . 405
pendula, Forsk. . 408
sagittata, V. . . . 405
semperviva, F. . . 408
sempervirens, V. . 408
sonchifolia, L. . . 405
tenuissima, Boj. . 406
tuberosa, Del. . . 414
uniflora, S. & T. . 402
Cachrys abyssinica, Hochst. 17
Cadamba jasminiflora, Sonn. 125
Calendula arvensis, L. 424
Cæsulia radicans, W. 373
Calostephane . . . 362
divaricata, *Bth.* . . 363
Campanula 481
dimorphantha, *Schweinf.* 481
esculenta, A. Rich. 482
Quartiniana, *A. Rich.* 481
rigidipilia, *Steud. et Hochst.* . . . 482
Schimperi, Vatke . 482
sarmentosa, Hochst. 482
Camptopus Mannii, Hk. f. 226
CAMPANULACEÆ . . 463
Caræa pinifolia, Hochst. 423
Cancellaria senegalensis, Sch. Bip. . . . 321
Candidea senegalensis, Ten. 291
Carduus 433
abyssinicus, Sch. Bip. 434
Buchingeri, Sch. Bip. 434
chamæcephalus, *O. & H.* 434
lanceolatus, L. . . 435
leptacanthus, *Fres.* . 433
macracanthus, Sch. Bip. 434
Schimperi, *Sch. Bip.* 434
Canthium 132
acutiflorum, *Hiern* . 136
Afzelianum, *Hiern* . 142
anomocarpum, *DC.* . 136
Barteri, *Hiern* . . 143
bibracteatum, *Hiern* 145
caudatiflorum, *Hiern* 137

Page

congense, *Hiern* . . 141
Cornelia, *Ch. & Schl.* 140
crassum, *Hiern* . . 145
discolor, *Benth.* . . 138
ellipticum, Hochst. . 116
fœtidum, *Hiern* . . 142
glabriflorum, *Hiern* 140
glaucum, *Hiern* . . 134
gracile, *Hiern* . . 139
Heudelotii, *Hiern* . 139
hispidum, *Benth.* . 140
horizontale, Benth . 143
horizontale, *Hiern* . 137
laniciflorum, *Hiern* . 146
lividum, *Hiern*, . . 144
lucidum, Br. . . . 136
Mannii, *Hiern* . . 143
? multiflorum, *Hiern* 144
neglectum, *Hiern* . 135
nervosum, *Hiern* . 143
nitens, *Hiern* . . 135
oligocarpum, *Hiern* 138
parviflorum, Lam. . 134
polycarpum, *Schw.* . 139
rubens, *Hiern* . . 142
Schimperianum, *A. Rich.* 135
senegalense, A. Rich. 140
setiflorum, *Hiern* . 134
setosum, *Hiern* . . 141
subcordatum, *DC.* . 141
Thonningii, *Benth.* . 134
vanguerioides, *Hiern* 146
Vatkeanum, *Hiern* . 136
venosum, *Hiern* . . 144
zanzibaricum, *Kl.* . 138
Caquepiria Bergkia, Gm. 101
Carpodinus dulcis, R. Br. 525
Carthamus 439
lanatus, *L.* . 439, 440
leucocaulos, *Sibth.* . 440
persicus, W. . . . 440
tinctorius, *L.* . . 439
Carum 12
Carui, L 12
copticum, *B. & Hk. f.* 12
Ridolfia, B. & Hk. f. 12, 19
Caucalis 25
abyssinica, Hochst. . 25
africana, Th. . . 25
infesta, *Curt.* . . 25
melanantha, *B. & Hk. f.* 26
Cenocline cinerea, C. K. 398

Page

Centaurea 436
abyssinica, *Sch. Bip.* 436
Calcitrapa, *L.* . . 437
Hochstetteri, *O. & H.* . . . 438
Kotschyi, Sch. Bip. 437
Kordofana, Asch. . 437
papposa, Sch. Bip. . 437
Perrottetii, DC. . . 437
præcox, *O. & H.* . 438
senegalensis, *DC.* . 437
somalensis, *O. & H.* 438
rhizocephala, *O. & H.* 438
varians, *A. Rich.* . 436
varians, *A. Rich.* . 437
Centunculus. . . . 490
minimus, *L.* . . . 490
Cephaëlis 222
bidentata, Benth. . 223
bidentata, Thunb. . 210
clausa, *Hiern* . . 225
congensis, *Hiern.* . 226
coriacea, G. Don . . 223
cornuta, *Hiern* . . 224
ferruginea, G. Don . 75
fuscescens, *Hiern* . 224
latifolia, *Hiern* . . 226
Mannii, *Bth. & Hk. f.* 225
pedunculata, G. Don 223
peduncularis, *Sal.* . 223
rubescens, *Hiern* . 225
spathacea, *Hiern* . 225
suaveolens, *Schw.* . 224
Cephalanthus africanus, Reich. 40
Cephalaria 250
acaulis, *Steud.* . . 251
centauroides, *R. & S.* 251
decurrens, R. & S. . 251
Cephalina esculenta, S. & T. 39
scandens, DC. . . 39
Cephalostigma . . . 471
bahiense, A. DC. . 472
erectum, Vat. . . 472
hirsutum, *Edg.* . . 472
Perrottetii, *A. DC.* 472
Perrottetii, Hk. f. . 473
Prieurei, *A. DC.* . 473
ramosissimum, *Hemsl.* 472
Schimperi, H. . . 472
Ceratostigma . . . 487
abyssinicum, *Asch.* . 487
Cerbera ovata, Sieb. . 462
Ceruana. 304
pratensis, *Forsk.* . 305
rotundifolia, Cass. . 305

Page

senegalensis, DC. . 305
Cervicina campanuloides, Del.. 479
Chærophyllum affine, Steud. 16
Chæthymenia pedunculare, H. & A. . 395
Chasalia, Comm. . . 193
? laxiflora, Benth. . 214
parviflora, Benth. . 204
umbraticola, Vatke . 214
Chiliocephalum . . . 337
Schimperi, *Bth.* . . 337
Cheliusia abyssinica, Sch. Bip. 284
Chomelia, L. . . . 89
Chomelia, Jacq. . . 99
Chrysanthellum . . 394
abyssinicum, Sch. Bip. 387
indicum, DC. . . 395
procumbens, *Pers.* . 395
senegalense, DC. . . 395
Swartzii, DC. . . 395
Chrysocoma amara, S. & T. 284
spathulata, F.. . . 271
violacea, S. & T. . 276
Chrysophyllum . . . 498
africanum, *A. DC.* . 500
albidum, *G. Don* . 500
? alnifolum, *Baker* . 499
macrophyllum, G. Don 500
majalismontanum, *Sond.* 498
obovatum, *G. Don* . 501
prunifolium, *Baker* . 499
subnudum, *Baker* . 499
Cichorium 446
calvum, *Sch. Bip.* . 446
Cineraria 404
abyssinica, *Sch. Bip.* 404
coronata, Thunb. . 415
grandiflora, Vatke . 404
Schimperi, *Sch.* *Bip.* 404
Cirsium abyssinicum, Sch. Bip. 435
arctotidifolium, Sch. Bip. 435
Buchingeri, Sch. Bip. 435
lanceolatum, Scop. . 435
Cnicus 434
chamæcephalus, Vatke 434
lanceolatus, *W.* . . 435

Page

polyacanthus, *Hochst.* 435
Schimperi, *Vatke* . 435
Crassocephalum cernuum, M. 402
Coffea 179
Afzelii, *Hiern* . . 184
arabica, Benth. . 181–2
arabica, *L.* . . . 180
brevipes, *Hiern* . . 182
hirsutus, G. Don . 126
hypoglauca, *Welw.* . 183
jasminoides, *Welw.* . 185
laurina, Poir. . . 161
laurifolia, Salisb. . 181
liberica, *Bull* . . 181
melanocarpa, *Welw.* 183
? microcarpa, *DC.* . 183
mozambicana, *DC.* . 185
Perottetii, ? Steud . 183
racemosa, *Lour.* . . 185
ramosa, R. & S. . 185
rupestris, *Hiern* . 184
stenophylla, *G. Don* 182
subcordata, *Hiern* . 184
zanguebariæ, *Lour.* . 182
Compositæ 253
Conium 9
chærophylloides, E. & Z.. . . . 9
verrucosum, Hochst. 15
maculatum, *L.* . . 9
Conyza 311
absinthifolia, DC. . 319
abyssinica, *Sch.* *Bip.* 313
ægyptiaca, *Ait.* . . 314
ambigua, DC. . . 308
amœna, Link . . . 323
argentea, P. & L. . 322
aurea, Perv.. . . 284
baccharoides, Sch. Bip. 329
Bovei, DC. . . . 323
brasiliensis, Hort. . 331
clarenceana, *O. & H.* 316
ctenoptera, Bth.. . 324
dentata, DC. . . . 314
dentata, W.? . . . 314
Dioscoridis, Rauw. . 329
dongolensis, Del. . 312
echioides, A. Rich.. . 314, 317
fastigiata, W. . . 312
frutescens, Pers.. . 284
gnaphalioides, Sch. Bip. 316
Gouani, *W.* . . . 316

Page

guineensis, W. . . 322
Heudelotii, *O. & H.* 317
Hochstetteri, *Sch.* *Bip.* 312
Hochstetteri, Vatke . 316
hypoleuca, *A. Rich.* 317
hypoleuca, A. Rich. 310
incana, *W.* 318
Kotschyi, Sch. Bip. 362
Kraussii, Sch. Bip.. 329
leucophylla, Sch. Bip. 318
lineariloba, DC. . . 314
macrorrhiza, Vatke . 314
macrorrhiza, Sch. Bip. 319
modatensis, Sch. Bip. 329
nana, *Sch. Bip.* . . 315
Newii, *O. & H.* . 317
pauciflora, W. . . 283
pectinata, *Sch. Bip.* 315
persicæfolia, *O. & H.* 312
pyrrhopappa, *Sch.* *Bip.* 318
radiata, Perr. . . 284
rutilans, Poir. . . 284
Schimperi, Sch. Bip. 319
senegalensis, *W.* . 314
spathulifolia, Max . 319
spinosa, *Sch. Bip.* . 312
Steudelii, *Sch. Bip.* 313
stricta, *W.* 318
thyrsoidea, Pers. . 323
tigrensis, *O. & H.* . 316
variegata, *Sch. Bip.* 315
variegata, Vatke . . 317
Vatkeana, *O. & H.* . 314
veronicæfolia, Wall. 313
Coptosperma, Hk. f. . 88
nigrescens, Hk. f. . 92
Coreopsis 387
abyssinica, *Sch. Bip.* 389
Barteri, *O. & H.* . 390
Borianiana, Sch. Bip. 392
Buchingeri, Sch. Bip. 392
callosa, Sch. Bip. . 392
chrysantha, *Vatke* . 388
glaucescens, *O. & H.* 389
Grantii, *Oliv.* . . 388
guineensis, *O. & H.* 390
involucrata, Sch. Bip. 392
Kirkii, *O. & H.* . . 390
linearifolia, *O. & H.* 390

macrantha, *Sch. Bip.* 391
macroptera, Sch. Bip. 391
monticola, *O. & H.* 390
pachyloma, *O. & H.* 391
Prestinaria, *Sch. Bip.* 391
prestinariæformis, *Vatke* 389
Rüppellii, Sch. Bip. 388
setigera, Sch. Bip. . 391
Steppia, *Steetz* . . 388
Coriandrium sativum, L. 3
Coronocarpus Gayanus, Benth. 381
helianthoides, Benth. 380
helianthoides, Sch. & Th. 381
Kotschyi, Benth. . 381
Prieureanus, Benth. 381
Cortusoides, Afz. . . 45
Corynanthe 43
paniculata, *Welw* . 43
Cotula 397
abyssinica, *Sch. Bip.* 398
anthemoides, *L.* . . 397
cinerea, *Del.* . . . 398
cryptocephala, *Sch. Bip.* 399
dichrocephala, Sch. Bip. 397
Kotschyi, *Bth. & Hk. f.* 398
minor, Car. . . . 398
pusilla, Shanb. . . 398
sphæranthus, Link. . 304
Craterispermum . . 160
brachynematum, *Hiern* 161
cerinanthum, *Hiern* 161
laurinum, *Benth.* . 160
montanum, *Hiern* . 162
Schweinfurthii, *Hiern* 161
Cremaspora . . . 126
africana, *Bth.* . . 126
heterophylla, F. Didr. 126
? Thomsoni, *Hiern* . 126
Cremocephalum, sp. . 402
Crepis 448
achyrophoroides, *Vatke* 450
adenothrix, Sch. Bip. 450
carbonaria, *Sch Bip.* 449
Hookeriana, *O. & H.* 450
Rueppellii, *Sch. Bip.* 450
Newii, *O. & H.* . . 449
nivalis, Sch. Bip. . 448
Schimperi, *Sch. Bip.* 449
Schultzii, *Hochst.* . 448
tenerrima, Sch. Bip. 449
Crossopteryx . . . 43
febrifuga, Benth. . 44
Kotschyana, *Fenzl.* 44
Cryphiospermum abyssinicum, Sch. Bip. 372
repens, Beauv. . . 373
Crystallopollen angustifolium, St. 273, 274
latifolium, St. . . 273
Cuminum cyminum, L. 3
Cussonia 31
angolensis, *Hiern* . 32
arborea, *Hochst.* . 31
Barteri, *Seem.* . . 32
Kirkii, *Seem.* . . 32
spicata, *Th.* . . . 32
Cuviera 156
acutiflora, *DC.* . . 156
africana, Spr. . . 157
longiflora, *Hiern* . 157
subuliflora, *Benth.* . 157
trilocularis, *Hiern* . 157
Cyanopis Borianiana, Sch. Bip. 297
hypoleuca, Sch. Bip. 278
Leopoldi, Sch. Bip. . 277
Cyphia 471
glandulifera, *H.* . 471

Daucus 24
abyssinicus, C. A. M. 25
abyssinicus, *Hochst.* 25
Carota, *L.* 25
melananthus, St. . 27
Decaneurum amygdalinum, DC. . . . 284
senegalense, DC. . 284
Denekia 330
capensis, *Thbg.* . . 331
Dianthoseris . . . 456
Rüppellii, *Sch. Bip.* 456
Schimperi, *Sch. Bip.* 456
Dichrocephala . . . 302
abyssinica, Sch. Bip. 303
chrysanthemifolia, *DC.* 303
latifolia, *DC.* . . 303
macrocephala, Sch. Bip. 303
oblonga, Hk. f. . . 303
Dicoma 442
anomala, *Sond.* . . 443
Gerrardi, Harv. . 443
karaguensis, Oliv. . 443
Kirkii, *Harv.* . . 444
lanuginosa, DC. . 443
sessiliflora, *Harv.* . 444
tomentosa, *Cass.* . 443
Diodia 230
arenosa ?, *DC.* . . 231
breviseta, *Benth.* . 231
foliosa, W. & P. . 231
Kirkii, *Hiern* . . 230
littoralis, W. & P. . 232
maritima, *Thonn.* . 231
pilosa, S. & T. . . 236
rubricosa, *Hiern* . 231
sarmentosa, Sw. . . 232
scabra, S. & T. . . 238
scandens, Sw. . . 232
senensis, Kl. . . 236
vaginalis, *Benth.* . 232
Dictyandra 85
arborescens, *Welw.* . 86
involucrata, *Hiern* . 86
Diospyros 517
Barteri, *Hiern* . . 521
crassiflora, *Hiern* . 525
batocana, *Hiern* . . 520
bicolor, Klotzsch . 519
Dendo, *Welw.* . . 523
dioica, Perr. . . 519
Heudelotii, *Hiern* . 524
Kirkii, *Hiern* . . 523
Loureiriana, *G. Don* 522
Mannii, *Hiern* . . 524
mespiliformis, *Hochst.* 518
platyphylla, *Welw.* . 519
senegalensis, Perr. . 519
senensis, *Klotzsch* . 520
squarrosa, *Klotzsch.* 522
tricolor, *Hiern* . . 521
verrucosa, *Hiern* . 519
virginica dulcis . . 525
Diplocrater, Hk. f. . 117
Diplolophium . . . 17
abyssinicum, *B. & Hk. f.* 17
africanum, Turcz. . 17
zambesianum, *Hiern* 17
Diplospora, DC. 118, 120
Diplostemma acaule, Sch. Bip. . . . 368
alatum, DC. . . . 368
Dipsaceæ 249
Dipsacus 249
appendiculatus, St. . 250
pilosus, L. . . . 250
pinnatifidus, *Steud.* 250
Schimperi, A. Br. . 250

setosus, *Hiern* . . 250
Dipterotheca Kotschyii, Sch. Bip. . . . 381
Dirichletia 50
glabra, *Kl.* . . . 51
glaucescens, *Hiern* . 51
pubescens, *Kl.* . . 51
Dowbrowskia, Presl. . 464
stellarioides, Presl. . 470
Durieua abyssinica, Boiss. 25

EBENACEÆ 509
Echinops 430
amplexicaulis, *Oliv.* 431
chamæcephalus, *Hochst.* 433
giganteus, *A. Rich.* 432
hispidus, *Fres.* . . 432
longifolius, *A. Rich.* 431
longisetus, *A. Rich.* 432
macrochætus, *Fres.* . 432
spinosus, *L.* . . . 431
serratifolius, Sch. Bip. 431
Eclipta 373
alba, *Hassk.* . . . 373
erecta, L. 373
filicaulis, S. & T. . 384
prostrata, L. . . 373
punctata, L. . . . 373
Eisenmannia clandestina, Sch. Bip. . 375
Elephantopus . . . 298
scaber, *L.* 299
senegalensis, *O. & H.* 298, 299
Embelia 496
abyssinica, *Baker* . 497
guineensis, *Baker* . 496
nilotica, *Oliv.* . . 496
Emilia 405
cæspitosa, *Oliv.* . . 406
flammea, Cass. . . 405
? gracilis, *DC.* . . 406
humifusa, DC. . . 405
pumila, *DC.* . . . 406
purpurea, Cass. . . 405
rigidula, DC. . . 405
sagittata, *DC.* . . 405
sonchifolia, Bth. . 405
sonchifolia, *DC.* . 405
Empogona 114
Kirkii, *Hk. f.* . . 115
Enhydra 372
fluctuans, *Lour.* . 372
Heloncha, DC. . . 373
longifolia, DC. . . 373
paludosa, DC. . . 373
Enterospermum . . 92
littorale, *Hn.* . . 93
Epaltes 331
alata, Steetz. . . . 332
brasiliensis, *DC.* . 331
gariepina, *Steetz.* . 332
umbelliformis, Steetz 332
ERICACEÆ 482
Erica 483
acrophya, Fres. . . 483
arborea, *L.* . . . 483
Ericinella 484
Mannii, *Hk. f.* . . 484
Erigeron 307
abyssinicus, Sch. Bip. 314
ægyptiacum, L. . . 314
alpinus, *L.* . . . 307
ambiguus, Sch. Bip. 308
Buchingeri, Sch. Bip. 308
echioides, Sch. Bip. 317
erythrolepis, Sch. Bip. 308
exstipulatum, S. & T. 314
glabratus, H. & H. 307
Gouani, L. . . . 316
Grantii, *O. & H.* . 308
Hochstetteri, Sch. Bip. 313
hypoleucus, Sch. Bip. 318
incanum, V. . . . 318
leucophyllus, Sch. Bip 318
linifolium, W. . . 308
macrorrhizus, Sch. Bip. 319
nanus, Sch. Bip. . 315
pectinatus, Sch. Bip. 315
persicæfolium, Bth. 312
pyrrhopappus, Sch. Bip. 318
Schimperi, Sch. Bip. 318
spathulatum, S. & T. 308
spinosus, Sch. Bip. . 312
stipulatum, S. & T. 322
Steudelii, Sch. Bip. . 313
variegatus, Sch. Bip. 316
vernonioides, Sch. Bip. 310
Erlangea 265
plumosa, *Sch. Bip.* . 265
Eryngium 6
fœtidum, *L.* 6
Erythrocephalum . . 440
longifolium, *Bth.* . 441
minus, *Oliv.* . . . 442
nutans, *Bth.* . . 441
Zambesianum, *O. & H.* 441
Ethulia 262
alata, Sond. . . . 332
angustifolia, Boj. . 263
brasiliensis, Link. . 331
conyzoides, *L.* . . 262
gariepina, DC. . . 332
gracilis, Del. . . . 262
Kraussii, Sch. Bip. . 263
Rüppellii, Hochst. . 263
Euclea 511
angustifolia, Bth. . 512
bilocularis, *Hiern* . 514
divinorum, *Hiern* . 513
fructuosa, *Hiern* . 513
Kellau, *Hochst.* . . 514
lanceolata, *E. Mey.* 512
multiflora, *Hiern.* . 513
pseudebenus, *E. Mey.* 512
Eupatorium 300
africanum, *O. & H.* 301
coloratum, W. . . 284
hispidum, Pers. . . 301
paniculatum, Ldl. . 295
scandens, L. . . . 301
sinuatum, Lour. . . 301
Euryops 422
arabicus, St. . . . 423
pinifolius, *A. Rich.* . 423

Fadogia 152
agrestis, *Schw.* . . 154
ancylantha, *Schw.* . 155
Cienkowskii, *Schw.* 154
fuchsioides, *Welw.* . 155
glaberrima, *Welw.* . 155
lactiflora, *Welw.* . 156
leucophlœa, *Hiern* . 153
stenophylla, *Welw.* . 155
Zeyheri, *Sond.* 153, 155
Felicia 306
abyssinica, *Sch. Bip.* 306
Richardi, *Vatke* . 306
Schimperi, S. & H. 307
Feretia 115
apodanthera, *Del.* . 115
? canthioides, *Hiern* 116
Ferreola guineensis, S. & T. 515
Ferula 17
abyssinica, Hochst. . 17
communis, *L.* . . . 17
Filago 336
abyssinica, Sch. Bip. 336
apiculata, L. . . . 336
germanica, *L.* . . 336
pyramidata, L. . . 336

Page

Forniculum capillaceum, Gil. . . . 3
officinale, All. . . . 3
vulgare, Gært. . . . 3
Francœuria crispa, Cass. 367

Gaillonia 232
calycoptera, *J. & S.* 232
Galiniera 114
coffeoides, *Del.* . . 114
Galium 244
Aparine, *L.* 245
Biafræ, *Hiern* . . 245
Decaisnei, *Boiss.* . 246
dasycarpum, Hochst 245
hamatum, Hochst. . 246
hamatum, Schw. . 245
Mollugo, *L.* 246
rotundifolium, *L.* . 245
rotundifolium, var. Hk. f. 245
simense, Fres. . . 245
simense, *Hochst.* . 246
spurium, L. . . . 245
Vaillantii, DC. . . 245
Gardenia 99
Abbeokutæ, *Hiern* . 104
? *acuminata*, Don. 95
Annæ, *Wr.* 103
assimilis, *Afz.* . . 102
bignoniæflora, Welw. 112
calycina, Don. . . 112
coccinea, Don. . . 70
crassicaulis, Sal. . 101
crinita, Afz. . . . 81
Devoniana, Ldl. . 97
dumetorum, Retz. . 94
dumosa, Sal. . . . 94
fernandensis, *Hiern* 105
gummifera, L. f. . 101
Jovis-tonantis, *Hiern* 101
konguensis, *Hiern* . 104
longiflora, Ait. . . 97
longifolia, Don. . . 97
longistyla, Hk. . . 106
lutea, Fres. . . . 101
macrantha, R. & S. 97
malleifera, Hk. . . 98
Manganjæ, *Hiern* . 103
medicinalis, V. . . 101
nitida, *Hk.* . . . 102
octomera, Hook. . . 99
paleacea, A. R. . . 106
parviflora, Sm. . . 117
pulchella, G. D. . . 81

Page

resiniflua, *Hiern* . 102
Rothmannia, L. f. . 98
Sherbourniæ, Hk. . 112
speciosa, A. Rich. . 97
speciosa, Sal. . . . 101
Stanleyana, Hk. . 97
ternifolia, S. & T. . 101
Tinneæ, K. & H. . 101
Thunbergia, *L. f.* . 100
triacantha, D.C.. . 101
tubiflora, Andr. . . 108
urcelliformis, *Hiern* 104
verticillata, Lam. . 101
Vogelii, *Hk. f.* . . 103
Whitfieldi, L. DC. . 98
? zanguebarica, *Hiern* 105
Gazania 427
serrulata, *DC.* . . 428
Geigeria 367
acaulis, *B. & Hk. f.* 368
alata, *B. & Hk. f.* . 368
Genipa labiata, Sm. . 84
Geophila 220
Afzelii, *Hiern* . . 221
hirsuta, *Benth.* . . 221
involucrata, *Schw.* . 222
lancistipula. *Hiern* . 221
obvallata, *F. Didr.* 222
reniformis, Benth. . 222
reniformis ? *D. Don* 220
uniflora, *Hiern* . . 221
Gerbera 445
abyssinica, *Sch. Bip.* 445
ovalifolia, DC. . . 445
piloselloides, *Cass.* . 445
Schimperi, Sch. Bip. 445
Gnaphalium 341
abyssinicum, Sch. Bip. 351
adenocarpum, Sch. Bip. 351
adoënsis, Sch. Bip. . 341
argyrosphærum, Sch. Bip. 351
auriculatum, *A. Rich.* 342
biafranum, Bth. et Hk. f. 352
Buchingeri, Sch. Bip. 352
chrysocephalum, Sch. Bip. . . . 354
chrysocoma, Sch. Bip. 354
crispatulum, Del. . 348
elegantissimum, Sch. Bip. 350

Page

fœtidum, L. . . . 352
formosissimum, Sch. Bip. . . . 350
fruticosum, Forsk. . 354
gerberæfolium, Sch. Bip. 353
globosum, Sch. Bip. 354
gracillimum, Perr. . 345
Hochstetteri, Sch. Bip. 340
horridum, Sch. Bip. 349
hurdwaricum, Wall. 336
indicum, L. . . . 345
itinérarii, Sch. Bip. 345
luteo-album, *L.* . . 313
luzuloides, Sch. Bip. 340
melanosphærum, *Sch. Bip.* . . . 342
nubicum, Sch. Bip. . 344
niliacum, *Rad.* . . 344
Petitianum, *A. Rich.* 342
pulvinatum, *Del.* . 344
purpureum, *L.* . . 345
Schimperi, Sch. Bip. 341
sclerochlænum, Sch. Bip. 341
spinosum, Sch. Bip. 348
stenophyllum, *O. & H.* 344
Steudelii, *Sch. Bip.* 313
uliginosum, L. . . 344
uliginosum, A. Rich. 344
Unionis, *Sch. Bip.* . 313
Gongrothamnus . . 400
divaricatus, *St.* . . 401
Hildebrandtii, *O. & H.* . . . 401
solidaginifolius, *O. & H.* . . . 401
Goodenoviæ . . . 461
Grangea 304
ægyptiaca, DC. . . 304
ceruanoides, Cass. . 304
cinerea, Link . . . 398
maderaspatana, *Poir.* 304
procumbens, DC. . 304
Sphæranthus, C. K. 304
Grumilea 215
articulata, *Hiern* . 218
Kirkii. *Hiern* . . 216
macrocarpa, *Hiern* . 217
micrantha, *Hiern* . 217
psychotrioides, *DC.* 216
sphærocarpa, *Hiern* 218
succulenta, *Hiern* . 216

sulphurea, *Hiern* . 218
venosa, *Hiern* . . 217
Guettarda 125
speciosa, *L.* . . . 125
Guizotia 384
abyssinica, *Cass.* . 384
bidentoides, *O. & H.* 386
discoidea, Sch. Bip. 374
oleifera, DC. . . . 385
Schimperi, *Sch. Bip.* 385
Schultzii, *Hochst.* . 385
villosa, *Sch. Bip.* . 386
Gutenbergia 263
abyssinica, Sch. Bip. 263
cordifolia, *Bth.* . . 265
longipes, *St.* . . . 264
macrocephala, *O. & H.* 264
nigritana, *O. & H.* 264
Petersii, *St.* . . . 263
polycephala, *O. & H.* 264
Rüppellii, *Sch. Bip.* 263
Gymnanthemum abyssinicum, Sch. Bip. 284
amygdalinum, Sch. Bip. 284
angustifolium, Benth. 282
cupulare, Cass. . . 284
quercifolium, St. . 284
Gymnoscadium pimpinelloides, Hochst. . . . 14
Gynura 401
amplexicaulis, *O. & H.* . . . 403
aurantiaca, Bth. . 403
cernua, *Bth.* . . . 402
crepidioides, *Bth.* . 403
diversifolia, Sch. Bip. 403
microcephala, Vatke 403
miniata, *Welw.* . . 403
polycephala, Bth. . 403
vitellina, *Bth.* . . 402

Haplocarpha . . . 427
scaposa, *Harv.* . . 427
Thunbergii, DC. . . 427
Haplosciadium . . . 10
abyssinicum, Hochst. 10
Harpephora Endlicheriana, Walp. . . . 461
Hedyotis. 51
abyssinica, Hochst. 58
aspera, Heyne . . 58
Bojeri, Vat. . . . 54
Caffra, Steud. . . 58
capensis, Lam. . . 63
corymbosa, Vat. . . 62
decumbens, Hochst. 55
dichotoma, A. R. . 60
fugax, Vat. . . . 55
Gerrardi, Sond. . . 58
globosa, Hochst. . . 54
goreensis, DC. . . 63
grandiflora, A. R. . 57
herbacea, Bl. . . . 62
herbacea, L. . . . 62
lancifolia, Schum. . 62
longifolia, S. & T. . 62
macrophylla, L. & P. 64
micrantha, Hochst. 60
monanthos, Hochst. 61
pentamera, Hochst. 64
pentandra, S. & T. 64
pusilla, Hochst. . 62
Quartiniana, A. R. 57
riparia, DC. . . . 63
sabulosa, DC. . . 63
Schimperi, Presl. . 56
senegalensis, A. R. 58
setifera, Sond. . . 58
sperguloides, A. R. 62
strumosa, Hochst. . 58
trichopoda, A. R. . 62
trinervia, R. & S. . 63
virgata, W.? . . . 59
wauensis, Schw. . . 64
zanguebariæ, *R. & S.* 56
Heinsia 80
benguelensis, *Welw.* 82
densiflora, *Hiern* . 81
jasminiflora, *DC.* . 81
pubescens, Kl. . . 81
Hekistocarpa . . . 65
minutiflora, *Hk. f.* . 65
Helichrysum . . . 354
abyssinicum, *Sch. Bip.* 351
adenocarpum, *DC.* . 350
annuus, L. . . . 461
argyrosphærum, *DC.* 351
auriculatum, *Less.* . 347
biafranum, *Hk. f.* . 351
chrysocoma, Sch. Bip. 354
chrysocephalum, Sch. Bip. . . . 354
citrispinum, *Del.* . 348
cymosum, *Less.* . . 353
elegantissimum, *DC.* 350
fœtidum, *Cass.* . . 352
formosum, Sch. Bip. 350
formosissimum, Sch. Bip. 350
fruticosum, Vatke . 354
gerberæfolium, *Sch. Bip.* 352
globosum, *Sch. Bip.* 354
glumaceum, DC. . 340
glutinosum, A. Br. . 352
gracilipes, *O. & H.* 348
horridum, *Sch. Bip.* 349
Kirkii, Vatke . . 349
Kirkii, *O. & H.* . . 349
Mannii, Hk. f. . . 352
Newii, *O. & H.* . . 349
Nimmoanum, *O. & H.* 347
pachyrhizum, *Harv.* 346
nitens, *O. & H.* . . 350
oxyphyllum, *DC.* . 353
Petersii, *O. & H.* . 349
Quartinianum, *A. Rich.* 348
rosulatum, *O. & H.* 347
spinosum, Sch. Bip. 348
splendidum, Less. . 351
Steudelii, Sch. Bip. . 313
undatum, *Less.* . . 353
Heliopsis platyglossa, Cass. 385
Helosciadium nodiflorum, Koch. . . . 11
simense, Hochst. . . 15
Heptapleurum . . . 29
abyssinicum, *B. & Hk. f.* 29
Baikiei, *Hiern* . . 30
Barteri, *Hiern* . . 30
elatum, *Hiern* . . 30
Mannii, *B. & Hk. f.* 31
scandens, *Hiern* . . 30
Herderia 297
stellulifera, *Bth.* . 298
truncata, *Cass.* . . 298
Heterachæna . . . 455
massaviensis, *Fres.* . 455
Heteromorpha . . . 10
abyssinica, Hochst. 10
arborescens, *C. & S.* 10
Hinterhubera abyssinica, Sch. Bip. . . 387
Kotschyi, Sch. Bip. 395
Hochstetteria . . . 444
Schimperi, *DC.* . . 444
Holarrhena africana, A. DC. 44
Homalocline Schimperi, Sch. Bip. . . 449

Page

Hydrocotyle 3
adoënsis, Hochst. . 5
americana, *L.* . . 4
asiatica, *L.* . . . 6
Bonariensis, *Lam.* . 4
grossularioides, Rich. 5
javanica, *Th.* . . 4
Mannii, Hk. f. . . 5
minima, Hochst. . 4
monticola, Hk. f. . 4
moschata, *Forst.* . 5
nummularioides, Rich. 6
natans, *Cyr.* . . . 5
nitidula, *Rich.* . . 5
petiolaris, DC. . . 4
Hylacium owariense, Beauv. 204
Hymenodictyon . . 42
biafranum, *Hiern* . 42
Kurria, *Hochst.* . 42
Hypericophyllum compositarum, St. . 395
Hypodematium . . . 240
ampliatum, A. Rich. 241
sphærostigma, *A. Rich.* . . . 240
sphærostigma, A. Rich. . . . 236

Imbricaria 508
fragrans, *Baker* . . 509
Inula 357
arbuscula, *Del.* . . 357
confertiflora, *A. Rich.* . . . 358
fruticosa, Sch. Bip. 358
glomerata, *O. & H.* 359
leptoclada, Webb. . 362
macrophylla, *Sch. Bip.* 358
Mannii, *Bth. et Hk. f.* 358
somalensis, *Vatke* . 357
Inulaster Kotschyi, Sch. Bip. 362
macrophyllus, Sch. Bip. 358
Iphiona 359
? microphylla, *Vatke* 360
rotundifolia, *O. & H.* 360
scabra, *DC.* . . . 360
Ixora 162
abyssinica, Oliv. . 174
africana, P. de B. . 171
brachypoda, DC. . 164
brachysiphon, *Hiern* 165
breviflora, *Hiern* . 165

Page

Brunonis, Hort. . 164
foliosa, *Hiern* . . 166
guineensis, *Benth.* . 165
inundata, *Hiern* . . 166
laxiflora, *Sm.* . . 164
minutiflora, *Hiern* . 167
modesta, *Hiern* . . 167
nitida, S. & T. . . 176
odorata, *Hook.* . . 163
odoratissima, Kl. . 164
owariensis, Poin. . 171
radiata, *Hiern* . . 163
riparia, *Hiern* . . 164
Soyauxii, *Hiern* . . 166
ternifolia, Hk. f. . 177
Thomsoni, *Hiern* . 164

Jägeria abyssinica, Spr. 385
Jardinia plumosa, Sch. Bip. 265
Jaumea 395
compositarum, *Bth. & Hk. f.* . . . 395
pedunculuris, Bth. & Hk. f. 395

Karamyschewia hedyotoides, F. & M. . 64
Kellaua Schimperi, A. DC. 514
Kentrophyllum lanatum, DC. . . . 439
leucocaulon, DC. . 440
Kiliana chrysopsioides, Sch. Bip. . . . 364
Kleinia longiflora, DC. 421
semperviva, DC. . . 408
Klenzea abyssinica, Sch. Bip. 356
rosmarinifolia, Sch. Bip. 356
Knoxia senegalensis, Rich. 56
Kohautia arabica, Hochst. . . . 56
cæspitosa, Schn. . 56
grandiflora, DC. . 57
lasiocarpa, Kl. . . 55
longiflora, E. Mey. . 55
longifolia, Kl. . . 59
macrophylla, Kl. . 58
noctiflora, Hochst. . 57
parviflora, Bth. . 59, 60
rigida, Benth. . . 55
Schimperi, St. & Hochst. 56
senegalensis, C. & S. 56
setifera, DC. . . . 58

Page

stricta, DC. . . . 57
strumosa, Hochst. . 58
Kralikia myriocephala, Sch. Bip. . . . 337
Schultzii, Buch. . 337
Kraussia, Harv. . . 117
congesta, Oliv. . . 120
coriacea, Sond. . . 119
Kuhnia arabica, Hochst. et St. . 361
Kurria floribunda, H. & St. . . . 42

Lactuca 450
abyssinica, *Fres.* . 453
albiflora, Sch. Bip. 451
capensis, *Thunb.* . 452
glandulifera, *Hk. f.* 454
goræensis, *Sch. Bip.* 452
Hochstetteri, *Sch. Bip.* 453
humilis, Sch. Bip. . 454
Kotschyi, Sch. Bip. 451
massaviensis, Sch. Bip. 455
nubica, Sch. Bip. . 452
octophylla, Sch. Bip. 452
paradoxa, *Sch. Bip.* 454
pentaphylla, Sch. Bip. 451
Petitiana, Rich. . 452
rariflora, *Fres.* . . 454
sarmentosa, Wt. . 461
sativa, L. 451
Scariola, L. . . . 453
Schweinfurthii, *O. & H.* . . . 452
Serriola, L. . . . 453
taraxicifolia, *S. & T.* 451
virosa, *L.* . . . 453
Laggera 323
alata, *Sch. Bip.* . 326
aurita, Sch. Bip. . 322
Braunii, *Vatke* . . 326
brevipes, *O. & H.* . 327
crassifolia, *Sch. Bip.* 325
divaricata, *O. & H.* 325
heteromalla, Vatke 359
oblonga, *O. & H.* . 327
purpurascens, Sch. Bip. 324
Petitiana, Sch. Bip. 326
pterodonta, *Sch. Bip.* 324
sordida, Vatke . . 329
squarrosa, *O. & H.* . 325
tomentosa, *Sch. Bip.* 325
Lagynias, E. Mey. . . 156
Lamprothamnus . . 130

	Page
zanguebaricus, *Hiern*	130
Landia astrographa, Comm.	68
stelligera, Comm.	68
Landtia	426
Rüppellii, *Bth. & Hk. f.*	426
Lasianthus	228
africanus, *Hiern*	228
okelensis, Schw.	122
Launæa	460
bellidifolia, *Cass.*	460
sarmentosa, Sch. Bip.	461
Laurentia Michelii, A. DC.	468
Lecontea, A. Rich.	228
Lefeburia	23
abyssinica, *Rich.*	23
brachystyla, *Hiern*	23
Lepipogon, G. Bert.	247
obovatum, G. Bert.	247
Leptactina	87
densiflora, *Hk. f.*	87
heinsioides, *Hiern*	88
involucrata, Hk. f.	86
Mannii, *Hk. f.*	87
senegambica, *Hk. f.*	88
Leptactinia, Bth. et Hk. f.	87
Leptocladus, Oliv.	247
Leucothoë angustifolia, DC.	483
Leysera	355
discoidea, *Cass.*	355
capillifolia, DC.	355
Lightfootia	473
abyssinica, *H.*	474
annua, *A. DC.*	475
arenaria, *A. DC.*	476
collemioides, *A. DC.*	475
debilis, *A. DC.*	476
exilis, *A. DC.*	476
gracilis, *A. DC.*	476
marginata, *A. DC.*	474
napiformis, *A. DC.*	475
paniculata, *A. DC.*	476
tenuifolia, *A. DC.*	475
Welwitschii, *A. DC.*	477
Limnogenneton abyssinicum, Sch. Bip.	372
Lipotriche Brownei, DC.	382
Litogyne glabra, Harv.	332
scabra, Harv.	332
Lobelia	464
acutidens, *Hk. f.*	467
asperulata, Kl.	468
chirensis, *Rich.*	468
columnaris, *Hk. f.*	466
Deckenii, *Hemsl.*	466
exilis, *H.*	469
fervens, *Thunb.*	468
Giberroa, *Hemsl.*	465
inconspicua, *Rich.*	467
Laurentia, L.	468
lavendulacea, *Kl.*	470
Melleri, *Hemsl.*	468
natalensis, *A. DC.*	469
nuda, *Hemsl.*	469
Petersiana, Kl.	468
Plumierii, L.	462
pterocaulon, Kl.	468
Rhynchopetalum, *Hemsl.*	465
Schimperi, *H.*	467
senegalensis, *A. DC.*	469
stellarioides, *Bth. & Hk. f.*	470
subulata, Kl.	468
triquetra, L.	470
triquetra, Sieb.	469
trullifolia, *Hemsl.*	466
umbrosa, *H.*	468
Longchampia capillifolia, W.	355
Lysimachia	489
adoënsis, *H. & S.*	489
Quartiniana, *A. Rich.*	489
Ruhmeriana, *Vatke*	489
Maba	514
abyssinica, *Hiern*	516
buxifolia, *Pers.*	515
guineensis, A. DC.	515
lancea, *Hiern*	516
Mannii, *Hiern*	516
Mualata, *Welw.*	515
quiloensis, *Hiern*	517
Smeathmanni, *A.DC.*	515
vacciniæfolia, Benth.	515
Macrosphyra	105
longistyla, *Hk. f.*	106
Mæsa	491
cordifolia, *Baker*	492
indica, Hk. f.	492
lanceolata, *Forsk.*	492
picta, Hochst.	492
rufescens, A. DC.	492
Malabaila	24
abyssinica, *Boiss.*	24
Manettia lanceolata, V.	46
Margaretta rosea, Oliv.	131
Matricaria	396
? hispida, *Vatke*	397
Melanthera	381
abyssinica, *Bth. & Hk. f.*	382
Brownei, *Sch. Bip.*	382
pungens, *O. & H.*	382
Memecylon Donianum, Pl.	179
Menotriche strigosa, St.	377
Meyera guineensis, Spr.	373
Microglossa	308
angolensis, *O. & H.*	309
densiflora, *Hk. f.*	308
petiolaris, DC.	309
sessilifolia, *DC.*	309
volubilis, *DC.*	309
Microlecane	386
abyssinica, *Bth. & Hk. f.*	386
Microrhynchus, Lees	460
bellidifolius, DC.	461
Brunneri, Walp.	459
Dregeanus, DC.	461
Hochstetteri, Sch. Bip.	452
octophyllus, H.	452
pentaphyllus, H.	451
sarmentosus, DC.	461
Microtrichia	302
Perrottetii, *DC.*	302
Mikania	301
capensis, DC.	301
chenopodifolia, W.	301
mossambiquensis, St.	301
natalensis, DC.	301
oxyota, DC.	301
scandens, *W.*	301
tamoides, DC.	301
Mimusops	505
cuneifolia, *Baker*	506
fruticosa, *Bojer*	508
Kirkii, *Baker*	507
Kummel, *Hochst.*	508
lacera, *Baker*	507
Mochisia, *Baker*	506
multinervis, *Baker*	506
Schimperi, *Hochst.*	507
Mitracarpum	243
Dregeanum, E. M.	243
scabrum, *Zucc.*	243
senegalense, DC.	243
verticillatum, Vat.	243
Mitracarpus amplia-tus, Hochst.	241
sphærostigma, Hochst.	241
Mitragyne	40
africana, *Korth.*	40
macrophylla, *Hiern.*	41
Mitriostigma	111

Barteri, *Hk. f.* . . 111
? subpunctatum, *Hiern* 111
Monolopia major, DC. 461
Morelia 112
senegalensis, *A. Rich.* 113
Morinda 191
? chrysorhiza, DC. . 192
citrifolia, *L.* 161
geminata, DC. . . . 192
longiflora, *G. Don* . 192
lucida, Bth. 192
palmetorum, DC. . 223
quadrangularis, G. Don 192
Mostuea, F. Didr. . . 247
Mussænda 65
Afzelii, *G. Don* . . 66
arcuata, *Poir.* . . 68
discolor, Th. 70
elegans, *S. & T.* . 69
erythrophylla, *S. & T.* 69
fulgens, Br. . . . 69
grandiflora, *Bth.* . 70
? heinsioides, *Hiern* . 70
Isertiana, *DC.* . . 67
luteola, Hochst. . . 46
luteola, *Del.* 71
macrophylla, S. & V. 67
? platyphylla, *Hiern* 70
polita, *Hiern* . . . 67
rufa, A. Rich. . . 71
Schimperi, Hochst. . 45
splendida, Welw. . 69
stenocarpa, *Hiern* . 60
tenuiflora, *Bth.* . . 69
Myrsine 493
africana, *L.* 493
Kellau, Hochst. . 514
melanophlæos, *R. Br.* 494
querimbensis, *Klotzsch* . . . 493
simensis, *Hochst.* . 494
Myrsineæ 491

Nauclea africana, W. . 40
africana, Walp. . 42
bracteosa, Welw. . 41
latifolia, Sm. . . 39
microcephala, Del. . 40
macrophylla, P. & L. 41
platanocarpa, Pl. . 40
sambucina, T. W. . 39
stipulosa, DC. . . 41
stipulacea, G. Don . 41
Neurocarpæa . . . 50
lanceolata, Br. . . 46
Nidorella 310
auriculata, DC. . . 311
membranifolia, Ib. . 310
microcephala, *St.* . 310
punctulata, DC. . 319
vernonioides, *Sch. Bip.* 310
Noltia tricolor . . . 521
Nothopanax farinosum, Seem. . . 28
Notonia 406
abyssinica, *A. Rich.* 407
coccinea, *O. & H.* . 407
Evantii, *O. & H.* . 407
grandiflora, DC. . 408
Hildebrandtii, Vatke 407
kleinioides, Sch. Bip. 422
Schweinfurthii, *O. & H.* 407
semperviva, Asch. . 408
trachycarpa, *Kotsch.* 408

Octodon 241
filifolium, *S. & T.* . 241
setosum, *Hiern* . . 242
Octotropis, Bedd. . . 130
Odontospermum . . 369
graveolens, *Sch. Bip.* 370
Oiospermum nigritanum, Bth. . . 264
Oldenlandia 51
abyssinica, *Hiern* . 57
biflora, L. 65
Bojeri, *Hiern* . . 53
cæspitosa, *Hiern* . 61
caffra, *E. & Z.* . . 58
capensis, *L. f.* . . 62
corymbosa, *L.* . . 62
decumbens, *Hiern* . 54
effusa, *Oliv.* . . . 59
flosculosa, *Hiern* . 60
globosa, *Hiern* . . 54
grandiflora, *Hiern* . 57
herbacea, DC. . . 62
herbacea? var., Bth. 61
hedyotoides, *Boiss.* . 64
Heynei, *Oliv.* . . 59
lancifolia, *Schw.* . 61
lasiocarpa, *Hiern* . 55
laxiflora, Bth. . . 64
linearis, DC. . . . 60
longifolia, DC. . . 62
macrophylla, *DC.* . 63
monanthos, *Hiern* . 60
noctiflora, *Hiern* . 57
obtusiloba, *Hiern* . 56
parviflora, *Oliv.* . 60
Peltospermum, *Hiern* 53
pentandra, DC. . . 64
pentandra, Retz. . 65
ramosissima, Hoh. . 64
retrorsa, Boiss. . . 56
repens, Berm. . . . 63
rigida, *Hiern* . . 55
riparia, St. . . . 63
Schimperi, *T. And.* 55
senegalensis, *Hiern* . 56
stricta, L. . . . 65
strumosa, *Hiern* . 58
tenuissima, *Hiern* . 61
trinervia, *Retz.* . . 63
umbellata, L. . . . 65
verticillata, Bacle . 243
virgata, *DC.?* . . 59
wauensis, *Hiern* . 64
zanguebariæ, Lour. . 56
Oligolepis angustifolia, St. 334
Sprunnera, St. . . 335
Ondetia 368
linearis, *Bth.* . . 368
Ophiorrhiza lanceolata, Forsk. . . 46
Orobanche abyssinica, Rich. 385
Osteospermum . . . 425
muricatum, *E. M.* 425
Othonna 423
Bainesii, *O. & H.* . 423
Otomeria 49
dilatata, *Hiern* . . 50
guineensis, *Benth.* . 49
lanceolata, *Hiern* . 50
madiensis, *Oliv.* . 49
Ouragoga, L. . . . 223
Oxyanthus 106
breviflorus, *Bth.* . 109
formosus, *Hk. f.* . 109
gracilis, *Hiern* . . 109
hireatus, DC. . . 108
macrophyllus, *Schw.* 110
? platystylis, *Hiern* . 109
querimbensis, *Kl.* . 109
rubriflorus, *Hiern* . 108
? Smithii, *Hiern* . 107
speciosus, *DC.* . . 108
speciosus, Sims . . 108
? sulcatus, *Hiern* . 108
Thonningii, Bth. . 108
tubiflorus, *DC.* . . 107
unilocularis, *Hiern* . 110
villosus, G. D. . . 106

Page
Pachystigma, Hochst.. 156
Pachythelia brasiliensis, St. 331
Paleya billotioides, Sch. Bip. . . . 461
Pallasia serratifolia, Sm. 383
Panax 27
ferrugineum, *Hiern* 28
fulvum, *Hiern* . . 28
pinnatum, *Rich.* . . 28
Parastranthus, G. Don 464
stellarioides, Vatke. 470
Paratropia elata, Hk. f. 30
Mannii, Hk. f. . . 31
Parthenium luteum, Spr. 385
Pastinaca atropurpurea, St. 21
Pauridiantha . . . 71
canthiifolia, *Hk. f.*. 71
Pavetta 167
abyssinica, *Fresen.* . 173
Baconia, *Hiern* . . 176
bidentata, *Hiern* . 170
brachycalyx, *Hiern*. 169
canescens, *DC.* . . 178
congesta, Br. . . . 174
Cornelia, Rich. . . 140
corymbosa, Houtt. . 176
crebrifolia, *Hiern* . 172
dolichosepala, *Hiern* 174
elliptica, Hochst. . 116
gardeniæfolia, *Hochst.* 177
genipæfolia, Benth. 176
genipæfolia, Schum. 175
glaucescens, *Hiern* . 171
gracilipes, *Hiern* . 179
gracilis, A. Rich. . 173
gracilis, *Kl.* . . . 173
gracilis, Korth. . . 173
hispida, *Hiern* . . 175
Hookeriana, *Hiern* . 176
incana, Kl. . . . 173
? lævis, Benth. . . 200
latiflora, G. Don . 179
longiflora, Hochst. . 178
macrosepala, *Hiern* 172
Mannii, *Hiern* . . 169
mollis, *Afz.* . . . 174
monticola, *Hiern* . 170
neurocarpa, *Benth.* . 172
Oliveriana, *Hiern* . 174
owariensis, *P. de B.* 170
parviflora, Afz. . . 143
puberula, *Hiern* . . 171
reflexa, Br. . . . 178
rigida, *Hiern* . . . 178
Smeathmanni, DC. . 143
subcana, *Hiern* . . 172
subglabra, Schum. . 174
? tenuifolia, Benth. . 200
ternifolia, *Hk. f.* . 177
tomentosa, A. R. . 178
Pegolettia 360
mucronata, *Bth.* . . 361
senegalensis, *Cass.* . 361
Peltospermum paniculatum, Bth. . . . 53
Pentaloncha . . . 79
humilis, *Hk. f.* . . 79
Pentanisia 131
cymosa, Kl. . . . 46
nervosa, Kl. . . . 46
Schweinfurthii, *Hiern* 131
suffruticosa, Kl. . 46
zanzibarica, Kl. . 47
Pentas 45
arvensis, *Hiern* . 47
carnea, *Benth.* . . 46
elatior, Benth. . . 48
Klotzschii, Vat. . . 46
occidentalis, *B. & Hk. f.* 46
parviflora, *Benth.* . 47
purpurea, *Oliv.* . . 46
Quartiniana, Oliv. . 46
Schimperiana, *Vat.* 45
? Thonningii, Walp. 64
zanzibarica, Kl. . 47
Pentodon 51
abyssinicus, Hochst. 64
decumbens, Hochst. . 64
paradoxa, Sch Bip. . 454
pentandrus, Vat. . 64
Peucedanum . . . 17
altum, *Hiern* . . . 20
araliaceum, *B. & Hk. f.* 21
atropurpureum, *Hiern* 21
(*Cervaria*) Hochst. . 24
fraxinifolium, *Hiern* 22
Grantii, *Kingst.* . 21
graveolens, B. & Hk. f. 19
graveolens, B. & Hk. f. 12
Petilianum, *Rich.* . 20
silaifolium, *Hiern* . 20
Phagnalon 337
abyssinicum, Sch. Bip. 338
Borianum, Sch. Bip. 338
hypoleucum, *Sch. Bip.* 338
nitidum, *Fres.* . . 338
Quartinianum, Rich. 338
Schweinfurthii, *Sch. Bip.* 338
scoparium, *Sch. Bip.* 338
Phallaria horizontale, Sch. 137
horizontalis, Sch. . 143
Schimperi, Hochst. . 136
spinosa, Sch. & Th. 134
Phyllactinia 442
Grantii, *Bth.* . . . 442
Phyteumoides hirsuta, Smeath. . . . 48
Picridium, Desf. . . 455
arabicum, H. & S. . 456
tingitanum, Desf. . 456
Picris 447
abyssinica, *Sch. Bip.* 448
? humilis, *DC.* . . 447
Pimpinella 13
arabica, Boiss. . . 16
etbaica, *Sch.* . . . 15
Gymnosciadium, *Hiern* 14
hirtella, Rich. . . 15
oreophila, *Hk. f.* . 14
peregrina, *L.* . . . 15
simensis, *B. & Hk. f.* 14
Piringa, Juss. . . . 101
Platycarpha 429
carlinioides, *O. & H.* 430
Plectocephalus abyssinicus, Boiss. . . 437
cyanoides, Boiss. . 436
Plectronia, DC. . . . 132
bibracteata, Baker . 145
hirsuta, DC. . . . 140
Schimperiana . . 136
Schimperi, Hochst. . 136
spinosa, Kl. . . . 134
venosa, Oliv. . . . 144
zanzibarica, Vatke . 139
Pleiogyne anthemodes, C. K. . . 398
Pleiotaxis 440
pulcherrima, *St.* . 440
Pluchea 327
crassifolia, Sch. Bip. 325
Dioscoridis, *DC.* . . 329
heterophylla, *Vatke* 330
Kotschyi, Sch. Bip. . 322
Kraussii, Sch. Bip. . 329
lanceolata, *O. & H.* 329
odorata, *Cass.* . . 328
ovalis, *DC.* . . . 328

phagnaloides, Hochst. 339
pinnatifida, *Hk. f.* . 330
senegalensis, Kl. . . 328
sordida, *O. & H.* . 328
subumbellata, Kl. . 317
PLUMBAGINEÆ . . . 485
Plumbago 486
amplexicaulis, *Oliv.* 487
auriculata, Hochst. 486
zeylanica, *L.* . . . 486
Polymnia abyssinica, L. f. 385
frondosa, Bruce . . 385
Polydora stæchadifolia, F. 272
Polysphæria 127
lanceolata, *Hiern* . 128
ligustriflora, Vatke . 127
multiflora, *Hiern* . 127
parvifolia, *Hiern* . 128
Schweinfurthii, *Hiern* 128
Pomatium spicatum, Gaert. f. 84
dubium, G. D. . . 95
Porphyrostemma . . 367
Grantii, *Bth.* . . . 367
Pouchetia 116
africana, *DC.* . . 117
parviflora, *Bth.* . . 117
saxifraga, Hochst. . 114
Prenanthes sarmentosa, W. 461
Prestinaria abyssinica, Sch. Bip. . . . 389
bidentoides, Sch. Bip. 391
macrantha, Sch. Bip. 391
PRIMULACEÆ. . . . 488
Primula 488
Boveana, Decne . . 488
simensis, Hochst. . 488
verticillata, *Forsk.* . 488
Psathura macrophylla, Boj. . . 145
Psiadia. 319
arabica, *J. & S.* . . 319
dodonææfolia, *St.* . 319
incana, *O. & H.* . . 320
punctulata, Vatke . 319
resiniflora, Sch. Bip. 319
Psilanthus 185
?ebracteolatus, *Hiern* 186
Mannii, *Hk. f.* . . 186
? tetramerus, *Hiern* 187
Psychotria 193
abrupta, *Hiern* . . 205
Afzelii, *Hiern.* . . 205
anetoclada, *Hiern* . 206
angustifolia, G. Don. 215
Ansellii, *Hiern* . . 214
arborea, *Hiern* . . 202
Benthamiana, *Hiern* 204
bidentata, *Hiern* . 209
bifaria, *Hiern* . . 198
bracteosa, *Hiern* . 207
Brassii, *Hiern* . . 204
breviflora, *Hiern* . 196
brunnea, *Sch.* . . 201
calva, *Hiern* . . . 199
?*chrysorhiza*, Thonn. 192
cornuta, *Hiern* . . 198
crispa, *Hiern*. . . 212
cristata, *Hiern* . . 205
Doniana, *Benth.* . 200
foliosa, *Hiern* . . 197
gabonica, *Hiern* . . 201
globosa, *Hiern* . . 208
humilis, *Hiern* . . 128
infundibularis, *Hiern* 209
insidens, *Hiern* . . 208
Kirkii, *Hiern* . . 206
Kolly, *Schum.* . . 203
konguensis, *Hiern* . 200
latistipula, *Benth.* . 210
leptophylla, *Hiern* . 200
longevaginalis *Schw.* 201
longistylis, *Hiern* . 209
lophoclada, *Hiern* . 197
lucens, *Hiern* . . 211
Mannii, *Hiern* . . 197
monticola, *Hiern* . 199
mucronata, *Hiern* . 211
multiflora, Thonn. . 145
nubica, *Del.* . . . 215
obscura, *Benth.* . . 212
obtusifolia, *Poir.* . 203
obvallata, Sch. . . 222
owariensis, *Juss.* . 204
pauridiantha, *Hiern* 196
pumila, *Hiern* . . 207
punctata, *Vatke* . . 203
recurva, *Hiern* . . 206
reptans, *Benth.* . . 211
nigropunctata, *Hiern* 207
Schweinfurthii, *Hiern* 210
sciadephora, *Hiern* . 202
setacea, *Hiern* . . 197
Soyauxii, *Hiern* . . 213
stictophylla, *Hiern* . 212
subherbacea, *Hiern* . 208
subnuda, *Hiern* . . 209
subobliqua, *Hiern* . 206
subpunctata, *Hiern* . 201
succulenta, Schw. . 216
sulphurea, Sch. . . 218
trachystyla, *Hiern* . 213
triflora, Thonn. . . 126
umbellata, *Thonn.* . 199
umbraticola, *Hiern* 214
umbraticola, Vatke . 214
viridis, *Hiern* . . 213
Vogeliana, *Benth.* . 210
zambesiana, *Hiern* . 203
zanguebarica, *Hiern* 214
Pterocephalus frutescens, Hochst. . . 253
Quartinianus, Rich. 253
Ptychostigma saxifragum, Hochst. . . 114
Ptychotis coptica, DC. 12
Pulicaria 363
arabica, Cass. . . 365
aromatica, Br. . . 366
chrysopsioides, Sch. Bip. 364
crispa, *Bth. & Hk. f.* 366
Grantii, *O & H.* . . 365
Hildebrandtii, *Vatke* 366
incisa, CC. . . . 366
involucrata, Br. . . 364
Kuntziana, *Vatke* . 364
orientalis, J. & S. . 366
petiolaris, *J. & S.* . 364
Renschiana, *Vatke* . 366
Rüppellii, *Sch. Bip.* 364
undulata, *DC.* . . 365
viscida, Br. . . . 307
vulgaris, *Gaert.* . . 365
Pycnocycla 8
abyssinica, Hochst. . 9
glauca, *Ldl.* . . . 8
Pyrhopappus humilis, Rich. 454
Hoschtetteri, Rich. . 454
Pyrostria comorensis, Boj. 145

Randia 93
acuminata, *Bth.* . . 95
africana, G. D. . . 99
Bowieana, A. C. . . 97
caudata, *Hiern* . . 96
coriacea, Bth. . . 121
Doniana, Bth. . . 112
dumetorum, *Lam.* . 94
gambica, *Hiern* . . 96
genipæflora, *DC.* . 95
longiflora, Sal. . . 97
Kraussii, Harv. . . 94

	Page
longistyla, DC.	106
macrantha, *DC.*	97
macrocarpa, *Hiern*	97
maculata, *DC.*	96
malleifera, *Bth. & Hk. f.*	98
Munsæ, *Schw.*	99
octomera, *Bth. & Hk. f.*	98
pallens, *Hiern*	96
reticulata, Bth.	121
rubens, *Hiern.*	95
Sherborniæ, Hk.	112
urcelliformis, Schw.	104
Reichardia,	455
tingitana, *Roth.*	455
Rhabdostigma	130
Kirkii, *Hk. f.*	131
Rhabdotheca Brunneri, Webb	459
chondrilloides, Sch. Bip.	460
prenanthoides, Sch. Bip.	459
Rueppellii, Sch. Bip.	460
Rhynchopetalum, Fres.	464
montanum, Fr.	465
Ricardia, Houst	242
Richardia	242
scabra, *L.*	242
Richardsonia, Kth.	242
scabra, St. Hil.	242
Rondelatia africana, T. W.	44
febrifuga, Afz.	44
floribunda, G. Don	44
loniceroides, G. Don	44
Rosea crassifolia, Kl.	124
jasminiflora, Kl.	124
Rothmannia Bowieana, Bth.	97
longiflora, Sal.	97
malleifera, Bth.	98
Stanleyana, Hk.	97
Royena	510
cistoides, *Welw.*	511
pallens, *Thunb.*	510
Rubia	243
Braunii, Hochst.	244
cordifolia, Hochst.	244
cordifolia, *L.*	244
discolor, *Turcz.*	244
tinctorum, L.	244
RUBIACEÆ	33
Rutidea	187
decorticata, *Hiern*	190
ferruginea, *Hiern*	189
fuscescens, *Hiern*	191
glabra, *Hiern*	190
hispida, *Hiern*	189
membranacea, *Hiern*	190
olenotricha, *Hiern*	189
parviflora, Benth.	189
parviflora, *DC.*	188
rufipilis, *Hiern*	188
Smithii, *Hiern*	189
Rytidea parviflora, Spr.	188
Rytigynia senegalensis, Bl.	149
Sabicea	74
calycina, *Bth.*	76
capitellata, *Bth.*	76
? cauliflora, *Hiern*	77
ferruginea, *Bth.*	75
? geantha, *Hiern*	78
pilosa, *Hiern*	76
? segregata, *Hiern*	77
venosa, *Bth.*	77
Vogelii, *Bth.*	76
Samolus	490
Valerandi, *L.*	490
Sanicula	7
capensis, E. & Z.	8
europæa, *L.*	8
SAPOTACEÆ	497
Sarcocephalus	38
esculentus, *Afz.*	38
Russeggeri, *K. & S.*	39
Scabiosa	251
Columbaria, *L.*	252
decurrens, Thunb.	251
frutescens, *Hiern*	252
succisa, L.	252
Scævola	462
Lobelia, *L.*	462
Plumierii, V.	462
senegalensis, Presl.	462
Sieberi, Vriese	462
Thunbergii, E. & Z.	462
Scandix infesta, L.	26
Scariola	451
Schaffnera carduoides, Sch. Bip.	443
Schistostephium	399
heptalobum, *Bth. & Hk. f.*	399
rotundifolium, *Fenzl.*	399
Schmidtia abyssinica, Sch. Bip.	447
ambigua, Cass.	447
Schnittspahnia Rüppellii, Sch. Bip.	426
Schimperi, Sch. Bip.	427
Sciadophyllum abyssinicum, Mig.	29
Barteri, Seem.	30
Baikiei, Seem.	30
elatum, Seem.	30
Manni, Seem.	31
Sclerocarpus	373
africanus, *Jacq.*	374
? discoideus, *Vatke*	374
Scolymus	446
maculatus, *L.*	446
Scorzonera africana, Poir.	461
pinnatifida, Lour.	461
Senecio	408
abyssinicus, *Sch. Bip.*	410
acutidentatus, Rich.	413
ægyptius, L.	411, 412
amoenus, Sch. Bip.	422
arabicus, *L.*	411
bellidifolius, Rich.	410
Biafræ, *O. & H.*	420
Bojeri, Hk. f.	420
bupleuroides, *DC.*	414
Burtoni, *Hk. f.*	416
cernuus, L. f.	402
clarenceana, *Hk. f.*	418
clematoides, *Sch. Bip.*	419
confertus, *Sch. Bip.*	415
coronopifolius, *Desf.*	412
crepidioides, Asch.	403
Decaisnei, DC.	422
deltoideus, *Less.*	420
discifolius, *Oliv.*	410
diversifolius, Rich.	403
emilioides, *Sch. Bip.*	411
farinaceus, *Sch. Bip.*	417
flavus, Sch. Bip.	422
Forbesii, *O. & H.*	420
Fresenii, *Sch. Bip.*	417
gabonicus, *O. & H.*	421
gaffatensis, Vatke	411
gigas, *Vatke*	418
Hochstetteri, *Sch. Bip.*	414
inæquidens, DC.	419
incrassatus, Guss.	422
kleinioides, *O. & H.*	421
lasiorhizoides, Sch. Bip.	415
lasiorhizus, *DC.*	415
latifolius, DC.	415
longiflorus, *O. & H.*	421
lyratipartitus, Sch. Bip.	404
macropappus, *Sch. Bip.*	413
Mannii, *Hk. f.*	418
myriocephalus, *Sch. Bip.*	417

nanus, *Sch. Bip.* . 422
ochrocarpus, *O. & H.* 416
papaverifolius, Rich. 413
paucifolius, *DC.* . . 414
Perrottetii, *DC.* . 412
Petitianus, *Rich.* . 419
pieridifolius, *DC.* . 413
pinnatipartitus, *Sch. Bip.* 412
purpureus, L. . . 418
Quartinianus, Asch. 410
rhomboideus, Harv. 414
rubens, Jacq. . . . 402
Rüppellii, Sch. Bip. 412
salviifolius, Sch. Bip. 422
Schimperi, *Sch. Bip.* 412
Schultzii, *Hochst.* . 417
solanoides, Sch. Bip. 414
Steudelii, *Sch. Bip.* 416
steudelioides, *Sch. Bip.* 415
steudelioides, Sch. Bip. 416
strictus, DC. . . . 413
subscandens, *Hochst.* 421
subsessilis, *O. & H.* 415
Tedlici, *O. & H.* . 420
tuberosus, *Sch. Bip.* 413
unionis, *Sch. Bip.* . 419
vulgaris, *L.* . . . 411
Serratula polygyna, Rich. 324
Seselichærophylloides, Th. 9
Sideroxylon . . . 501
brevipes, *Baker* . . 502
densiflorum, *Baker* . 503
diospyroides, *Baker* 502
dulcificum, *A. DC.* 503
longistylum, *Baker* 502
revolutum, *Baker* . 503
Sigesbeckia 371
abyssinica, *O. & H.* 372
orientalis, *L.* . . 372
Sipanea angustifolia, A. R. 48
carnea, Hort. . . 46
elatior, A. R. . . 48
Siphomeris 228
fœtens, *Hiern* . . 229
Sium 13
gallabatense, Schw. 13
nodiflorum, L. . . 11
simense, Gay . . 15
Thunbergii, *DC.* . 13
verrucosum, Gay . 15
Solanecio, Walp. . . 414
Sonchus 457
angustissimus, *Hk. f.* 458
asper, All. . . . 457
Bipontini, *Asch.* . . 458
Brunneri, *O. & H.* . 459
chondrilloides, Sibth. 460
ciliatus, Perr. . . 452
cornutus, *Hochst.* . 459
goræensis, Lam. . . 452
Hochstetteri, Sch. Bip. 452
lactucoides, Sch. Bip. 458
macrotus, Fenzl. . 457
massaviensis, Sch. Bip. 455
melanolepis, *Fres.* . 460
oleraceus, *L.* . . 457
pentaphyllus, Sch. Bip. 451
prenanthoides, *O. & H.* 459
rarifolius, *O. & H.* 460
serratus, Perr. . . 451
Schweinfurthii, *O. & H.* . . . 458
Schimperi, *A. Br.* . 457
Spachii, Schw. . . 454
spinosus, Lam. . . 457
taraxicifolius, W. . 451
tenerrimus, L. . . 457
Sparganophorus . . 262
africanus, St. . . 262
Vaillantii, *Gaert.* . 262
Spermacoce 233
ampliata, Hk. f. . 241
calyptera, Dec. . . 233
chætocephala, DC. . 240
commutata, Sch. . 231
compacta, *Hochst.* . 239
compressa, *Afz.* . 235
dibrachiata, *Oliv.* . 239
filifolia, P. & L. . 242
filiformis, *Hiern* . 234
galeopsidis, DC. . 240
globosa, *S. & T.* . 240
hebecarpa, Oliv. . 239
hebecarpa, *Oliv.* . 236
Kotschyana, *Oliv.* 239, 240
leucadea, *Hochst.* . 237
natalensis, Hochst. 236
ocymoides, Baker . 238
palmetorum, DC. . 238
Phyteuma, *Schw.* . 235
phyllocephala, DC. . 240
? pilosa, *DC.* . . 235
radiata, *Sieb.* . . 237
ramisparsa, *P.* . . 238
Ruelliæ, *DC.* . . 238
Ruelliæ, Thoms. . 241
senensis, *Hiern* . . 236
serrulata, Beauv. 231, 232
sphærostigma, Vat. 241
stachydea? *DC.* . 237
stricta, *L. f.* . . . 236
tenuissima, *Hiern* . 234
verticillata, L. . . 240
Sphæranthus . . . 332
abyssinicus, St. . . 333
africanus, L. . . 332
amaranthoides, Burm. 333
angustifolius, Sch. Bip. . . 333, 334
angustifolius, DC. . 332
hirtus, *W.* . . . 334
hirtus, Thoms. . . 334
indicus, Gært. . . 333
Kirkii, *O. & H.* . 333
Kotschyi, Sch. Bip. 334
microcephalus, Vatke 333
mossambiquensis, St. 334
nubicus, *Sch. Bip.* . 335
peduncularis, Oliv. . 332
polycephalus, *O. & H.* 334
suaveolens, *DC.* . 333
senegalensis, DC. . 334
sphenocleoides, *O. & H.* 333
Steetzii, *O. & H.* . 334
Sphærodendron angolense, Seem. . . 33
Sphenoclea 480
zeylanica, *Gærtn.* . 481
Spilanthes 383
abyssinica, Sch. Bip. 384
Acmella, *L.* . . . 384
africana, DC. . . 384
caulirhiza, DC. . . 384
costata, Benth. . . 384
Spiridanthus, Fenzl. . 461
Sprunnera alata, Sch. Bip. 335
Statice 485
axillaris, *Forsk.* . 486
Bovei, J. & S. . . 486
Brunneri, Webb . 486
lanceolata, Edgew. . 486
pectinata, Ait. . . 486
tuberculata, *Boiss.* . 485
Staurospermum verticillatum, S. & T. 243
Steganotænia araliacea, Hochst. . . . 22
Stengelia adoënsis, Sch. Bip. . . . 291

Page

Calvoana, Hk. f. . 293
controversa, Sch. Bip. 289
Kotschyana, Hochst. 289
Stephegyne africana, Walp. 40
stipulata, B. & H. f. 41
Stipularia 79
africana, *P. de B.* . 80
elliptica, *Sch.* . . 80
gabonica, *Ha.* . . 80
Stobæa Zeyheri, Harv. 429
Struchium africanum, Beauv. 262
Stylocoryne, sp. . . 177
conferta, Bth. . . 90
grandiflora, Bth. . 92
nitidula, Bth. . . 91
Synchodendron senegalense, Kl. 299
Synedrella nodiflora, Gært. 386

Tagetes erecta, L. . . 395
Tanacetum cinereum, DC. 398
Tarchonanthus . . 321
abyssinicus, Sch. Bip. 321
minor, Less. . . . 321
sesquiflorus, *L.* . . 321
Tarenna 88
angolensis, *Hn.* . . 89
conferta, *Hn.* . . 90
congensis, *Hn.* . . 91
grandiflora, *Hn.* . 91
mossambicensis, *Hn.* 89
nigrescens, *Hn.* . 92
nilotica, *Hn.* . . 90
nitidula, *Hn.* . . 90
pallidula, *Hn.* . . 91
tetramera, *Hn.* . . 91
Taxanthemum attenuatum, Br. . . 456
Teichostemma fruticosum, Br. . . . 289
Telekia africana, Hk. f. 369
Temnopteryx . . . 78
sericea, *Hk. f.* . . 78
Tetragonatheca abyssinica, Leb. . . 385
Theyodis octodon, A. Rich. . . . 64
Thunbergia capensis, Mont. 101
Tolpis 447
abyssinica, *Sch. Bip.* 447
altissima, Pers. . 447
Torilis africana, Spr. 26
Trachydium . . . 9

Page

abyssinicum, *B. & Hk. f.* 10
Tragium hirtellum, Hochst. . . . 15
Triainolepis . . . 219
africana, *Hk. f.* . 219
Hildebrandtii, *Vatke* 219
Tricalysia 117
angolensis, *A. Rich.* 125
biafrana, *Hiern* . . 122
bracteata, *Hiern* . 120
buxifolia, *Hiern* . . 119
congesta, *Hiern* . 120
coriacea, *Hiern* . . 120
crassifolia, *Bth. & Hk. f.* 124
djurensis, *Schw.* . 123
gabonica, *Hiern* . 122
jasminiflora, *Bth. & Hk. f.* 124
Kirkii, *Hiern* . . 124
micrantha, *Hiern* . 122
microphylla, *Hiern* 123
niamniamensis, *Schw.* 123
Nyassæ, *Hiern* . . 121
okelensis, *Hiern* . 122
ovalifolia, *Hn.* . . 119
pallens, *Hiern* . . 121
reticulata, *Hiern* . 121
Sonderiana, *Hiern* . 119
sysmanthera, *Hiern* 120
Trichostachys . . . 226
aurea, *Hiern* . . . 227
ciliata, *Hiern* . . 227
longifolia, *Hiern* . 227
petiolata, *Hiern* . 227
Tripteris 423
cheiranthifolia, Sch. Bip. 424
cuneifolia, Sch. Bip. 424
Lordii, *O. & H.* . 424
monocephala, *O. & H.* 424
Rüppellii, Sch. Bip. 424
Vaillantii, *Dec.* . . 424
Tupa, Auct. 464
Kerstenii, Vatke, . 466
Rhynchopetalum, H. 465
Schimperi, H. . . 466

Ubiæa Schimperi, Gay. 427
Ucriana racemosa, S. & T. 108
Umbelliferæ . . . 1
Uncaria 41
africana, *G. Don* . 41
inermis, W. . . . 40

Page

Urophyllum 72
Afzelii, *Hiern* . . 73
callicarpoides, *Hiern* 72
hirtellum, *Bth.* . . 72
insulare, *Hiern* . . 73
micranthum, *Hiern* 74
paucinerve, *Hiern* . 74
rubens, *Bth.* . . . 73
viridiflorum, *Sch.* . 74
Ursinia 425
abyssinica, Sch. Bip. 426
annua, *Less.* . . . 425
indecora, DC. . . 426
nana, DC. . . . 426
guineensis, W. . . 44

Vaillantia hispida, L. 246
Valerianeæ . . . 248
Valerianella 248
abyssinica, Fres. . 248
dentata, *Poll.* . . 248
microcarpa, Lois. . 248
Valoradia abyssinica, Hochst. . . . 487
patula, Hochst. . . 487
Vangueria 146
abyssinica, A. Rich. 148
Barnimiana, Schw.. 149
canthioides, *Bth.* . 149
concolor, *Hiern* . . 150
crassa, Schw. . . 145
edulis, Vahl. . . 148
edulis?, Unio It. . 149
euonymoides, *Schw.* 150
infausta, *Burch.* . 147
infausta, var. *virescens*, Sond. . . 148
leucophlæa, Schw. . 153
membranacea, *Hiern* 151
pauciflora, *Schw.* . 151
senegalensis, *B. & Hk. f.* 149
spinosa, Roxb. . . 152
tetraphylla, *Schw.* . 152
tomentosa, Hochst. . 148
umbellulata, *Hiern* . 150
velutina, *Hiern* . . 151
velutina, Hook. . . 148
venosa, Hochst. . . 148
Zeyheri, Sond. . . 154
Varthemia (Sch. Bip.) 323
arabica, T. Thoms. . 365
Kotschyi, Sch. Bip. . 362
Verbesina, L. . . . 383
abyssinica, Rich. . 389
Acmella, L. . . . 384
biflora, L. 376
chinensis, L. . . . 360

ciliata, Sch. . . . 378
lineata, Rich. . . 391
macrantha, Rich. . 391
monticola, Hk. f. . 390
Rüppellii, Rich. . . 388
veris, Rich. . . . 391
Vernonia 266
abyssinica, *Sch. Bip.* 288
adoënsis, *Sch. Bip.* . 291
adenosticta, F. . . 284
ambigua, *K. & P.* . 272
amygdalina, *Del.* . 284
arabica, Decaisne . 271
aristata, Sch. Bip. . 277
Aschersonii, *Sch. Bip.* 280
atriplicifolia, J. & S. 275
atriplicifolia, *J. & S.* 270
Bainesii, *O, & H.* . 272
Benthamiana, *O. & H.* 282
Biafræ, *O. & H.* . 270
Bipontini, Vatke . 278
blumeoides, *Hk. f.* . 281
Bojeri, Less. . . . 283
Buchingeri, *Sch. Bip.* 289
Burtoni, *O. & H.* . 281
Calvosana, *Hk. f.* . 293
cernua, Boj. . . . 297
cinerascens, Sch. Bip. 271
cinerascens, *Sch. Bip.* 275
cinerea, *Less.* . . 275
clarenceana, Hk. f. . 316
conferta, *Benth.* . . 294
cyanopidea, Hochst. 280
cylindrica, *Sch. Bip.* 293
cylindrica, Rich. . 296
demulans, *Vatke* . 274
Doniana, *DC.* . . 295
elæagnoides, Sch. Bip. 276
erubescens, Hochst. . 280
fastigiata, *O. & H.* . 282
filigera, *O. & H.* . 288
firma, *O. & H.* . . 290
flagellaris, Vatke . 279
Francavillana, *O. & H.* 296
frondosa, *O. & H.* . 294
gerberæformis, *O. & H.* 285
glabra, *Vatke* . . 286
Grantii, *Oliv.* . . 291
guineensis, *Bth.* . . 285
Hildebrandtii, Vatke 401
Hochstetteri, *Sch. Bip.* 287
hymenolepis, Rich. . 293
hymenolepis, Vatke . 288
infundibularis, *O. & H.* 285
insignis, *Hk. f.* . . 292
inulæfolia, *St.* . . 286
jaceoides, *Rich.* . . 281
jugalis, *O. & H.* . . 270
karaguensis, *O. & H.* 280
Kirkii, *O. & H.* . . 274
Köstlinii, Hochst . 287
Kotschyana, *Sch. Bip.* . . . 289, 291
Kotschyi, Sch. Bip. . 289
Kraussii, *Sch. Bip.* . 276
Leopoldi, *Vatke* . 277
Livingstoniana, *O. & H.* 295
macrocephala, Rich. 291
? Mannii, Hk. f. . . 359
marginata, *O. & H.* 278
Melleri, *O. & H.* . 282
misera, *O. & H.* . 278
Moramballæ, *O. & H.* 278
mossambiquensis, *O. & H.* 292
myriantha, *Hk. f.* . 297
myriocephala, *Rich.* 296
natalensis, *Sch. Bip.* 277
nigritiana, *O. & H.* 288
obconica, *O. & H.* . 286
pauciflora, *Less.* . . 283
paudurata, *Link.* . 271
Perrottetii, *Sch. Bip.* 272
Petersii, *O. & H.* . 273
plumbaginifolia, *F.* 279
podocoma, *Sch. Bip.* 296
polymorpha, Vatke 289, 290, 291, 292
Poskeana, *V. & H.* . 274
pteropoda, *O. & H.* 283
pumila, *K. & P.* . 292
purpurea, *Sch. Bip.* 281
Quartiniana, *Rich.* . 287
quercifolia, Vatke . 284
Rothii, *O. & H.* . . 283
Rüppellii, Sch. Bip. 297
Schimperi, Sch. Bip. 287
Schweinfurthii, *O. & H.* 285
senegalensis, *Less.* . 283
senegalensis, Desf. . 283
shirensis, *O. & H.* . 291
Smithiana, *Less.* . 276
solidaginifolia, Boj. 401
spathulata, Sch. Bip. 271
spathulata, Hochst. 275
stœchadifolia, Sch. Bip. 272
Steetziana, *O. & H.* 273
Tenoreana, *Oliv.* . 290
Thomsoniana, *O. & H.* 295
theophrastifolia, *Sch.* 294
tigrensis, *O. & H.* . 290
turbinata, *O. & H.* . 271
uncinata, *O. & H.* . 277
undulata, *O. & H.* . 276
unionis, *Sch. Bip.* . 280
urticæfolia, *Rich.* . 279
violacea, *O. & H.* . 275
Vogeliana, Thoms. . 295
zanzibarensis, *Less.* 278
Verulamia corymbosa, DC. 176
Veslingia scabra, Vis. 385
Vicoa 361
auriculata, *Cass.* . 362
divaricata, *O. & H.* 362
indica, DC. . . . 362
Virecta 47
augustifolia, *Hiern* . 48
? elatior, DC. . . . 48
multiflora, *Sm.* . . 48
paniculata, G. Don . 49
procumbens, *Sm.* . 48
setigera, *Hiern* . . 48
Vignaldia occidentalis, Hk. f. 46
Quartiniana, A. R. . 46
Quartiniana, var., Schw. 47
Schimperiana, A. Rich. 45
Vignaudia luteola, Sch. 71
Volutarella, Cass. . . 439

Wahlenbergia . . . 477
arguta, *Hk. f.* . . 478
campanuloides, Vat. 479
Cervicina, *A. DC.* . 479
etbaica, *Vatke* . . 480
globularis, Sch. et Th. 373
humilis, *A. DC.* . . 479
huillana, *A. DC.* . 479
inhambanensis, *Kl.* 480
Mannii, *Vatke* . . 478
perotifolia, W. & A. 472
polyclada, Hk. f. . 478
pusilla, *H.* . . . 479
riparia, *A. DC.* . . 480
Schimperi, H. . . 472
silenoides, *H.* . . 478
Webbia aristata, DC. . 277
elæagnoides, DC. . 276
serratuloides, DC. . 272
? Smithiana, DC. . 277
Webera, Schreb. . . 88
Wedelia 376

	Page
abyssinica, *Vatke*	377
africana, *Beauv.*	376
biflora, *Wt.*	376
Menotriche, *O. & H.*	377
mossambicensis, *Oliv.*	377
Wendlandia pilosa, G. D.	84
racemosa, G. D.	84
sulcata, G. D.	85
virgata, G. D.	117
Werneria	422
africana, *O. & H.*	422
nana, Cl.	422
Wirtgenia abyssinica, Sch. Bip.	379
frutescens, Sch. Bip.	378
Kotschyi, Hochst.	381
longeradiata, Hochst.	381
multiflora, F.	379
Schimperi, Sch. Bip.	379
Wollastonia biflora, DC.	376
scabriuscula, DC.	376
zanzibarensis, DC.	376
Wurschmittia abyssinica, Sch. Bip.	382
Xanthium	371
abyssinicum, Wallr.	371
antiquorum, Wallr.	371
brevirostre, Hochst.	371
strumarium, *L.*	371
Ximenesia	383
encelioides, *Cav.*	383
Zollikoferia prenanthoides, H.	459
Zygoon	113
graveolens, *Hiern*	114

END OF VOL. III.

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	Page		Page
Botany	3	Zoology	13
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